Image for Windows

User Manual

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Revision: 2015-10-31

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* The Image for Windows home page, with software and documentation update information, and support resources, can be found at www.terabyteunlimited.com/image-for-windows.htm.

* A support knowledge base for all TeraByte Unlimited products, including Image for Windows, can be found at www.terabyteunlimited.com/kb.

Registered users can email their questions to support@terabyteunlimited.com if you can't find a suitable resolution via the aforementioned support resources. If we cannot resolve the issue via email, we may provide telephone support.

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System Requirements

Any of the following operating systems (including x64** and server versions) are supported:

- Windows 8 *
- Windows 7 *
- Windows 2008 *
- Windows Vista *
- Windows XP *
- Windows 2003 *
- Windows 2000 *
- Windows NT *
- Windows Millennium
- Windows 98

** These operating systems require Administrator privileges to install and run Image for Windows.*

*** x64 versions of Windows are supported (AMD64/EM64T).*

Recommended: External hard drive

Note: You can use a writable CD, DVD, or BD drive, but an external hard drive is the preferred method.

If you will be restoring outside of Windows, as most home users will, or you are running Windows 98/Me, your computer's BIOS must provide access to the hard drive. In addition, it must meet the following minimum system requirements of Image for DOS:

IBM-compatible personal computer (Pentium or newer)

32-MB RAM

Warning to Windows 8.x and Windows 10 Users

You must disable the Windows *Fast startup* option or you risk corruption of your partitions and data when the partitions are used outside of Windows (e.g. you boot into Image for Linux after shutdown and save an image to a data drive).

To disable using Windows: Open the Control Panel and select *Power Options*. Click the *Choose what the Power buttons do* from the links on the left. Click the *Change settings that are currently unavailable* link and then remove the checkmark from the *Turn on fast startup (recommended)* option under *Shutdown settings*.

To disable using BootIt BM: Boot into BootIt BM, click *Partition Work* on the desktop, then select the Windows 8.x/10 partition and click *Properties*. Click the *Disable Fast Start* button.

Data Storage Size Unit Conventions

Since Image for Windows and this document refer to data storage size units, this section provides clarification on the definitions we use. Storage device manufacturers typically define gigabytes (GB) in base *decimal*, where 1 GB = 1,000 MB = 10^9 bytes = 1,000,000,000 bytes. Microsoft Windows, on the other hand, defines GB in base *binary*, where 1 GB = 1,024 MB = 2^{30} bytes = 1,073,741,824 bytes.

Because of the confusion that can result when these different data storage size unit conventions are each referred to as "gigabytes", the *gibibyte* (along with the kibibyte, mebibyte, etc.) was established in 1998 by the International Electrotechnical Commission (IEC). A gibibyte (abbreviated GiB) is a base binary unit, so 1 GiB = 2^{30} bytes = 1,073,741,824 bytes. The IEC retained the term *gigabyte* to refer to base decimal, where 1 GB = 10^9 bytes = 1,000,000,000 bytes.

Image for Windows and this document will follow IEC recommendations, and will thus use the terms megabyte (MB), gigabyte (GB), etc. to refer to base decimal, and mebibytes (MiB), gibibytes (GiB), etc. to refer to base binary. So, when you read about the data storage size convention used by Windows, the units will appear as mebibytes (MiB) or gibibytes (GiB), even though Windows itself refers to the units as megabytes (MB) or gigabytes (GB).

How Image for Windows Works

Image for Windows is a backup program that is designed to function in the Windows operating environment but can back up a hard disk containing any type of operating system. Image for Windows protects your system by creating a compressed or uncompressed "snapshot" of all *used areas* of your FAT, FAT32, NTFS, Ext2/3/4, ReiserFS, or HSF+ partition or volume. For other file systems, it saves and restores a compressed or uncompressed snapshot of *all sectors* in the partition or volume, both used and unused areas.

The snapshot backup created by Image for Windows is referred to as an *image*. You can write the image backup to a set of files that you store in a different partition of the hard drive you are backing up, on an external hard drive (the recommended approach), on a network drive, or directly to most USB 2, IEEE 1394, ATAPI CD-R/RW, DVD/RW, or BD drives. Image for Windows can also work with drives that make use of ASPI drivers, if you provide the appropriate DOS-based driver.

When you create the image, Image for Windows backs up the file system and files exactly as they are stored on the sectors of your hard drive at the time you make the backup, effectively taking a snapshot of your hard drive when you create the image. Image for Windows does not examine the files on your hard drive to make decisions about whether they should be backed up.

Note: See Appendix A: Understanding the Types of Backups on Page 198 for a description of file-based backups vs. sector-based backups. Appendix B: Backup Strategies on Page 199 describes the types of backup strategies you can use, and

the strategy you choose plays an important role when you need to restore a backup.

When you create a backup using Image for Windows, you back up not only your data files but also the operating system, in its entirety. To understand the full impact of having an image backup, suppose that you install a program to test it and discover it is not what you expected. You attempt to uninstall it and it misbehaves. Before you know it, the fully functional, well-behaved computer you fondly remember from 30 minutes ago is gone, and, in its place, you now have a devil child that won't even boot. If you restore an image backup taken before you installed the errant program, you effectively remove all traces of the program—your computer returns to the state it was in before you installed the errant program and life goes on as if the errant program never existed on your hard drive. To understand the technical details of how Image for Windows creates a sector-based image, see Appendix C: Introduction to Hard Drive Storage on Page 202.

After backing up with Image for Windows, your computer is protected from crashes, data loss, hardware problems, and malicious software (i.e. viruses), since you can restore the snapshot image whenever necessary.

You can view and extract individual files or folders from an image backup by using the free TBIView or TBIMount add-ons, which are included as part of the Image for Windows setup.

When you are ready to restore a backup file, you typically don't use Image for Windows because you cannot restore a Windows image while you work in that instance of Windows. So, instead, you can create an Image for DOS or an Image for Linux boot disc and then use either of those programs to restore your image. In both cases, when you boot your computer, you don't boot to Windows, so your Windows installation is not in use and you can safely restore it.

Note: When you purchase Image for Windows, you automatically receive copies of Image for DOS and Image for Linux. If you download the trial version of Image for Windows, you can also download the trial versions of Image for DOS and Image for Linux.

You can easily create an Image for DOS or Image for Linux boot disc using the MakeDisk utility that comes with those programs; just follow the steps in the section "Installing Image for DOS" or "Installing Image for Linux" of the respective manual.

The images you create using Image for Windows are fully compatible with the other TeraByte Unlimited Version 2 imaging programs, such as Image for DOS and Image for Linux. For example, you can create an image using Image for Windows and restore it using Image for DOS or Image for Linux. The reverse is also true: Images created by other TeraByte Unlimited imaging programs are compatible with Image for Windows.

Ways to Use Image for Windows

You can use Image for Windows in a variety of ways:

* **Local Usage**: You can make a backup with Image for Windows and the free add-on PHYLock that comes with Image for Windows. You can store the backup on a secondary hard drive partition, on an external hard drive, or on CD's or DVD's. Then, when you need to restore, boot from a CD/DVD, USB flash drive (UFD), floppy diskette, or other bootable media that has Image for DOS installed on it, and use Image for DOS to perform the restore operation.

* **Across a Network**: You can use Image for Windows to create an image file to a mapped network drive or UNC path. Using Image for DOS (after creating a network-capable boot media) or Image for Linux, you also can restore an image file from a mapped or mounted network drive. You can use push technology (not included) to automatically start the back up or restore across a network. You also can use Image for Windows from the Windows PE environment as described in the next bullet and in the section, "Using Image for Windows in BartPE" on Page 86 to back up and restore from a network path.

* **In Windows PE or Windows RE:** TBWinPE is based on the Windows AIK/ADK (requires download from Microsoft). Windows 7 and Windows 8 users can easily create TBWinRE boot media (does not require downloading the Windows AIK/ADK) and add Image for Windows to the Windows Recovery Environment. The TBWinRE files are automatically installed in the *tbwinre* sub-folder of the Image for Windows installation folder and can be accessed there or from the *Create Recovery Boot Disk* shortcut in the Start menu.

  When you boot your computer using this boot media, you boot to a Windows preinstallation environment state, where you can use Image for Windows to back up or restore your backup.

* **In Bart PE or Vista PE**: Image for Windows includes the "PE Builder Plugin Installer." You can use the plugin with the free Bart PE Builder, which allows you to build a bootable Windows CD or UFD that also contains Image for Windows (BartPE tutorial). A VistaPE build can also be created.

  When you boot your computer using this boot media, you boot to a Windows preinstallation environment state, where you can use Image for Windows to back up or restore your backup.

Image for Windows Quick Start

In this section, you'll find a general overview of the major processes Image for Windows can perform: making a recovery boot disk that you can use to boot your computer and restore a partition or a hard drive, backing up, restoring, and validating an existing backup image. Each of these processes is described in detail, including pictures, later in this manual.

Warning to Windows 8 Users: You must disable the Windows 8 *Fast startup* option or you risk corruption of your partitions and data. For instructions see "System Requirements" on page 6.

QuickStart: Creating a Recovery Boot Disc

Follow the steps in the section, “Installing Image for Windows” on Page 15 to install the product. While installing Image for Windows, you can also create the Image for DOS recovery boot media that you can use to boot your computer and restore a partition or a hard drive. This recovery media plays an important role in your use of Image for Windows. It is particularly useful if either your hard drive or the partition you use to boot become unusable. You use the MakeDisk utility to create the recovery boot media.

Boot Media and UEFI Systems

Computer systems that come from the manufacturer with Windows 8 installed include a new BIOS interface known as the Unified Extensible Firmware Interface (UEFI). This new BIOS interface boots media differently than a traditional BIOS. Microsoft also requires these systems to use a feature of UEFI called Secure Boot. When Secure Boot is enabled, the system will only boot items that have a digital signature that is included in the system firmware. The manufacturers include a digital certificate, provided by Microsoft, to boot Windows on their systems. Secure boot can be disabled (on non-ARM systems) to allow you to boot other operating systems and environments. Boot media must be specifically created for UEFI to allow UEFI to boot from it. However, most systems also include the ability to boot traditional boot media though a method or mode typically called Legacy or BIOS.

Using TeraByte Boot Media on UEFI Systems

When creating the boot media for a UEFI system it’s important to understand which media will boot properly on the UEFI system. System settings may require changing to boot Image for Linux or Image for DOS depending on the implementation of UEFI on the system.

- TBWinRE (the Image for Windows boot media) supports booting via CD or USB flash drive on UEFI systems. Secure Boot is supported and the BIOS can be in either UEFI mode or Legacy mode. TBWinRE is automatically installed with Image for Windows on Windows 7, 8, or later. You must run TBWinPE/RE Builder (or the TBWinRE script) to create your boot media.

- Image for Linux (IFL) v2.81 or later supports booting via CD or USB flash drive on UEFI systems (Secure Boot is supported).

- Image for DOS (IFD) will not boot on UEFI systems configured in UEFI mode. To boot on these systems Secure Boot must be disabled and you must enable or use Legacy mode.

Creating the Image for DOS Boot Media

Note: If you prefer, you can create TBWinPE or TBWinRE boot media (tutorials for creating TBWinPE and TBWinRE can be found on TeraByte’s website). You can also create BartPE or Image for Linux recovery media. To create a BartPE recovery disc, see the section, “Using Image for Windows in BartPE” on Page 86. To create

an Image for Linux recovery disk, see the Image for Linux manual. If your keyboard connects to your computer via a USB port, you might prefer to create and use an Image for Linux or a BartPE recovery media because both of those products support USB keyboards that DOS might not support.

The steps below assume that you have installed MakeDisk, but that you opted not to create the Image for DOS bootable recovery media at the same time that you installed Image for Windows. When you create the recovery media while installing Image for Windows, you skip Step 1 below.

Note: For detailed steps on creating a bootable recovery disc, see the section, "Creating a Bootable Image for DOS Disc" on Page 61.

1. Choose Start, All Programs, Terabyte Unlimited, Image for Windows, V2, Image for DOS, Create Recovery Boot Disk. This will trigger a UAC prompt in Windows Vista and Windows 7 if UAC is enabled. Select to allow the program to run.

2. Click Next on the MakeDisk welcome screen. The "Select the product to build" screen appears. Image for DOS can operate in simple or traditional mode. Select the operating mode you wish to use (the mode can be changed at any time in program settings) and click Next.

3. The "License Agreement" screen appears. Read the Image for DOS license agreement, and if you accept it, select the "I accept the agreement" button and click Next.

4. If you are creating the Image for DOS (GUI) boot media or you've placed a customized IFD.INI file in the directory with the MakeDisk files, the "Select the optional components" screen will be displayed. Otherwise, the "Device and Checkbox Options" screen will be shown (skip to Step 5).

Note: If you have a copy of IFD.INI in the folder where MAKEDISK.EXE resides, you can select the "IFD.INI file from local directory" option on the "Select the optional components" screen to include that file in the Image for DOS bootable disc or diskette.

   If creating the Image for DOS (GUI) boot media the next steps will allow you to select mouse and video options.

5. If you selected "Simple" in Step 2 skip to Step 7. Otherwise, enable the desired options on the "Device and Checkbox Options" screen. Click Next and the "Global Geometry Options" screen appears, followed by the "Miscellaneous Global Options" screen. See the section, "Creating a Bootable Image for DOS Disc" on Page 61 for a detailed description of these options.

6. Click Next and the "Additional IFD.INI Options" screen appears. Most of the options needed to use Image for DOS are set for you by default, but you can use this screen to set additional options.

7. Click Next and the “License” screen appears. If you own a licensed copy of Image for DOS, supply your product key.

8. Click Next and the “Select Target” screen appears. Choose the target that MakeDisk should use to create the bootable Image for DOS media.

You can create a bootable USB flash drive (UFD) with MakeDisk as long as the UFD is not larger than 64 GB.

9. Click Finish and respond to subsequent prompts as necessary. MakeDisk will then create your bootable media or ISO image. When MakeDisk finishes, the Success screen appears.

10. Click Close on the MakeDisk Success screen.

QuickStart: Making a Backup

To make a full backup of a drive or partition using Image for Windows, follow these steps:

Note: For detailed steps on creating a full backup, see the section, “Creating Backups with Image for Windows” on Page 26.

1. Click Start, All Programs, Terabyte Unlimited, Image for Windows, V2, Image for Windows or you can double-click the Image for Windows Desktop shortcut.

2. Select Backup (Full) and click Next.

3. Select a drive or partition to back up.

4. Select the target location where you want to store the backup image file(s).

5. Provide a name for the backup image file.

6. Set backup options.

    * For details on available backup options, see the section, “Setting Backup Options” on Page 48.

You can make a differential or incremental backup using the same steps; you simply select the Changes Only option on the Image for Windows menu instead of the Full Backup option. For details on backup strategies—that is, deciding whether to make full backups or use a combination of full backups and differential or incremental backups—see Appendix B: Backup Strategies on Page 199. For details on creating a differential or incremental backup, see the section, “Creating a Differential or Incremental Backup” on Page 54.

QuickStart: Restoring an Image

You can restore an Image for Windows backup using these steps:

Note: For detailed steps to restore a backup, see the section, "Using Image for Windows to Restore an Image" on Page 85

1. Boot your computer using the Image for DOS boot disk you can create using the steps in the section, QuickStart: Creating a Recovery Boot Disc or using the BartPE boot disk you can create using the steps in the section, "Using Image for Windows in BartPE."

2. On the Image for DOS main menu, select Restore (Normal).

Tip: If you select Restore (Automatic), Image for DOS will try to select for you the target location and the options you would ordinarily select in Steps 5 and 6.

3. Select the source location that contains the backup image file that you want to restore.

4. Select the backup image file you want to restore.

5. Select the target location that you want Image for Windows to overwrite with the information contained in the backup image file.

6. Set restore options.

    * For details on available restore options when you are restoring an entire drive, see the section, "Image for DOS Restore Options for an Entire Drive" on Page 78.

    * For details on available restore options when you are restoring an individual partition, see the section, "Image for DOS Restore Options for an Individual Partition" on Page 82.

QuickStart: Validating an Image

You can validate a backup as you create it or, if you don't have time to validate it when you create it, you can validate it later. Follow these steps:

Note: For detailed steps to validate a backup, see the section, "Validating Backups with Image for Windows" on Page 101.

1. Boot your computer using the Image for DOS boot media you can create using the steps in the section, QuickStart: Creating a Recovery Boot Disc or using the BartPE boot disk you can create using the steps in the section, "Using Image for Windows in BartPE."

2. On the Image for Windows main menu, select Validate.

3. Select the source location that contains the backup image file that you want to validate.

4. Select the backup image file you want to validate.

5. Set validation options.

   * For details on available validation options, see the section, “Understanding Validation Options” on Page 105.

Obtaining Image for Windows

You can download either the **unregistered trial version**, or the **registered version** of Image for Windows:

* If you *have not* purchased Image for Windows, click here to download the **unregistered trial version**.

* If you *have* purchased Image for Windows, click here to display a product download form for obtaining the **registered version**. *You will need to provide your name, email address, and Image for Windows order number.*

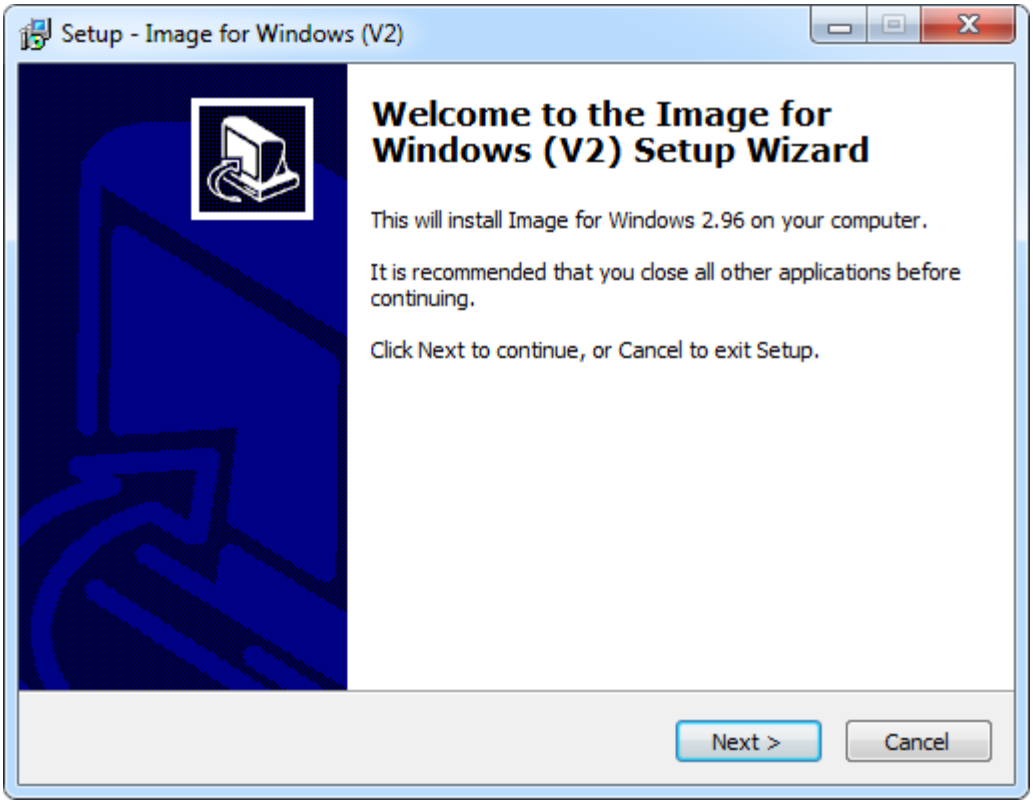
Note: If you use the trial version of Image for Windows to make a backup, you will be able to restore that image for 30 days. After that time, you will only be able to restore that image using a registered version of Image for DOS, Image for Linux, or Image for Windows.

If you are currently using an older version of Image for Windows, you do not need to uninstall it before installing Image for Windows 2.0. In fact, you may want to keep your older version for awhile. Image for Windows 2.0 can restore only those backups you create using Image for Windows 2.0; to restore backups you made using older versions of Image for Windows, you need those versions. You should update older versions to Image for Windows 1.7c or later so that your older version will be compatible with the version of PHYLock installed by Version 2.0.

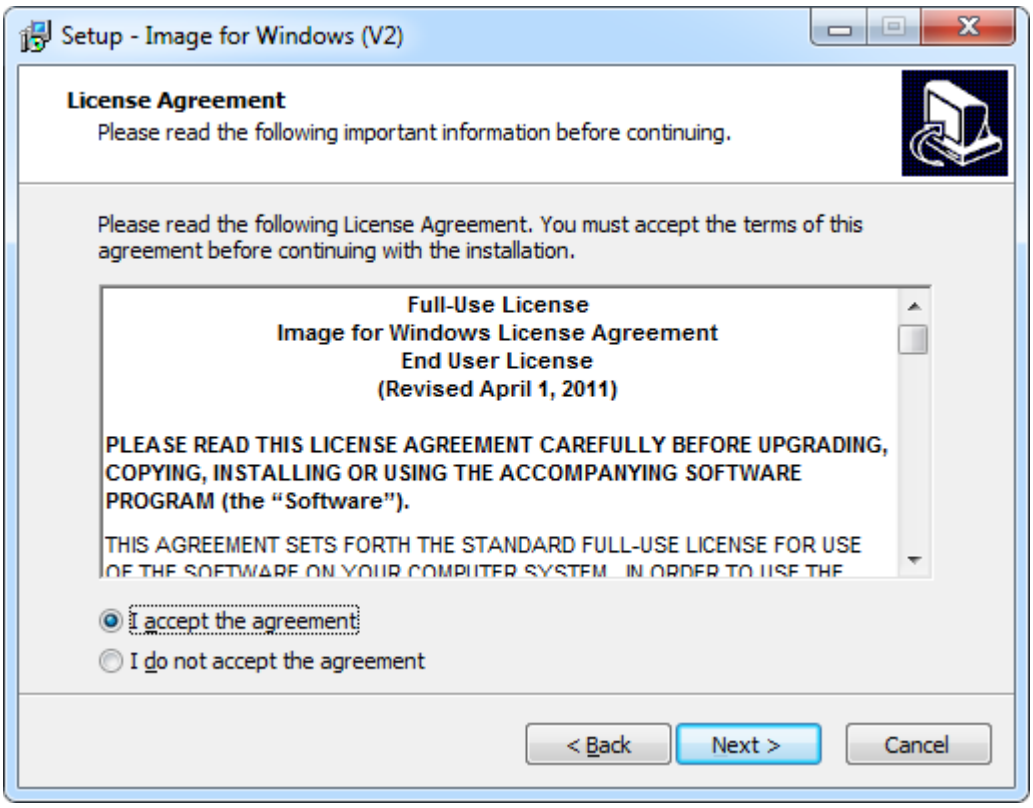
Installing Image for Windows

You install Image for Windows the same way you install most Windows programs.

1. Run the setup program you downloaded from the link provided above by double-clicking it. (This will trigger a UAC prompt on Windows Vista and Windows 7 if UAC is enabled. Select to allow the program to run.) The “Welcome to the Image for Windows (V2) Setup Wizard” screen appears.


Setup - Image for Windows (V2)
Welcome to the Image for Windows (V2) Setup Wizard
This will install Image for Windows 2.96 on your computer.
It is recommended that you close all other applications before continuing.
Click Next to continue, or Cancel to exit Setup.
Next >
Cancel

2. Click Next. The License Agreement window appears. Read the Image for Windows license agreement, and if you accept it, select the “I accept the agreement” option button.


Setup - Image for Windows (V2)
License Agreement
Please read the following important information before continuing.
Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.
Full-Use License
Image for Windows License Agreement
End User License
(Revised April 1, 2011)
PLEASE READ THIS LICENSE AGREEMENT CAREFULLY BEFORE UPGRADING, COPYING, INSTALLING OR USING THE ACCOMPANYING SOFTWARE PROGRAM (the “Software”).
THIS AGREEMENT SETS FORTH THE STANDARD FULL-USE LICENSE FOR USE
I accept the agreement
I do not accept the agreement
< Back
Next >
Cancel

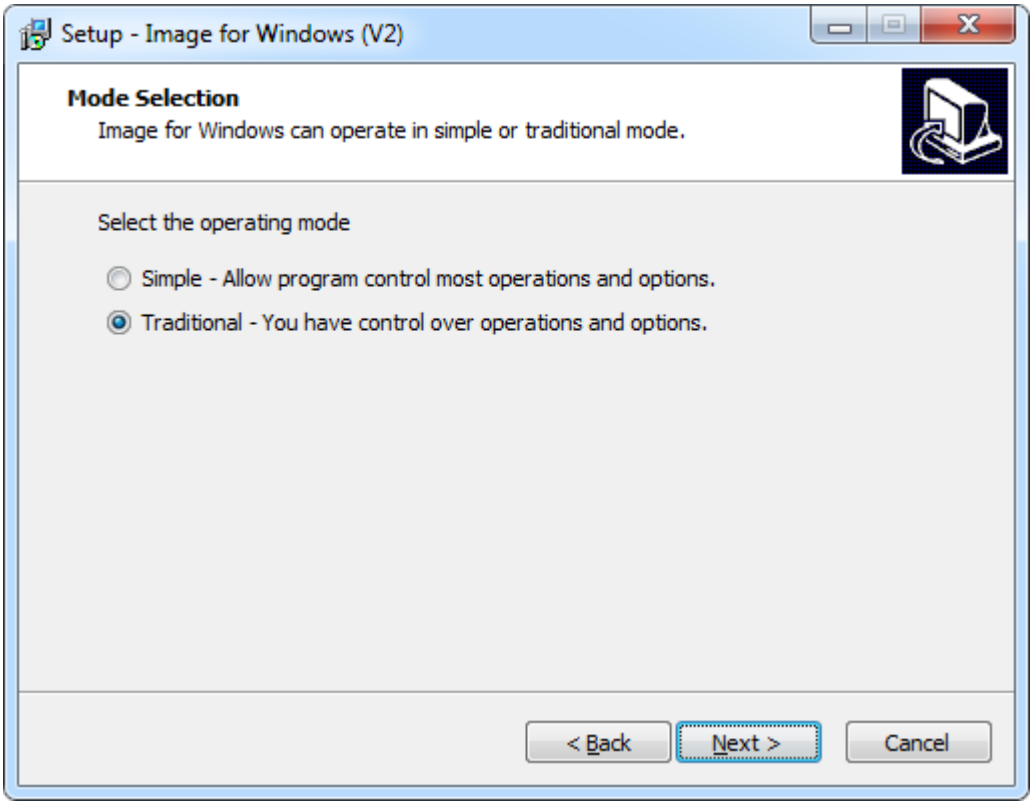
If installing Image for Windows for the first time (or after Image for Windows has been uninstalled), proceed to Step 3.

If you are updating an existing installation of Image for Windows and it was installed using the “Simple” option, proceed to Step 9. Otherwise, proceed to Step 5.

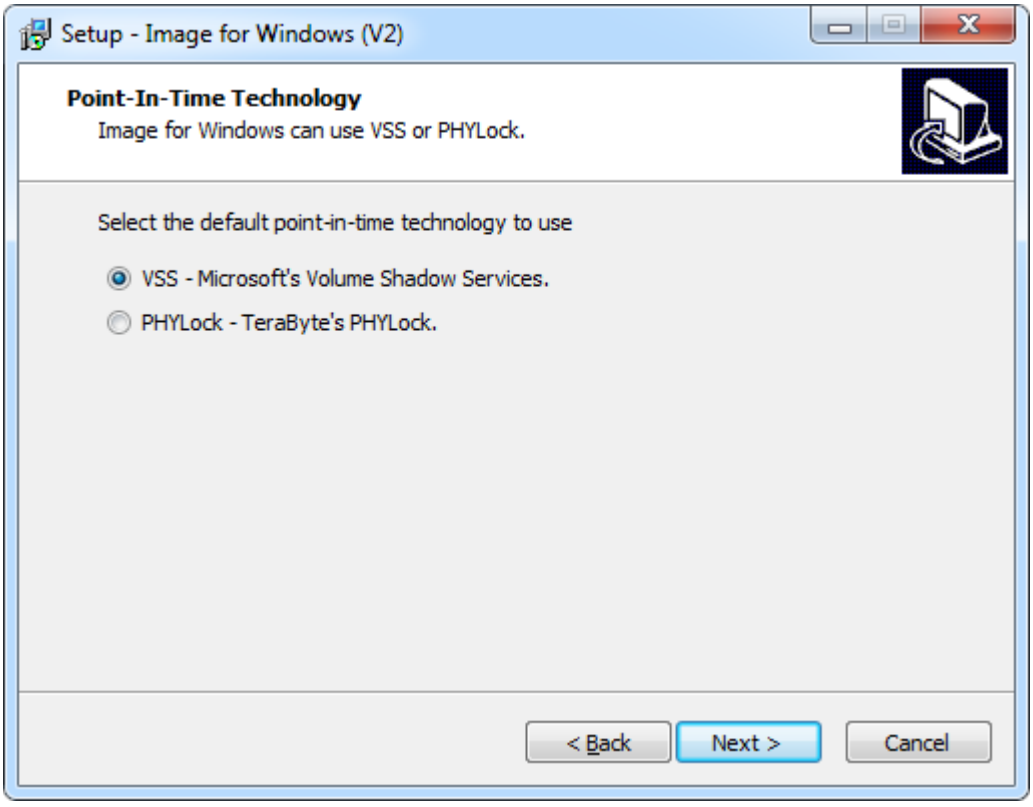
3. Click Next. The Mode Selection window appears. Image for Windows can operate in simple or traditional mode. Select the operating mode you wish to use (the mode can be changed at any time in program settings).

Selecting “Simple” will enable Simple Operations mode. This allows Image for Windows to automatically handle most options for you. Backup, Restore, Validate, and Copy operations are available in this mode. Refer to *Using Simple Operations Mode* on page 114 for details. Selecting “Simple” also allows the installer to automatically control the installation options.

Selecting “Traditional” will run Image for Windows in normal mode with all options available. You will also be able to configure the installation options.


Setup - Image for Windows (V2)
Mode Selection
Image for Windows can operate in simple or traditional mode.
Select the operating mode
Simple - Allow program control most operations and options.
Traditional - You have control over operations and options.
< Back
Next >
Cancel

4. Click Next. If you selected “Simple” in the previous step, proceed to Step 9. Otherwise, the Point-In-Time Technology screen is displayed.

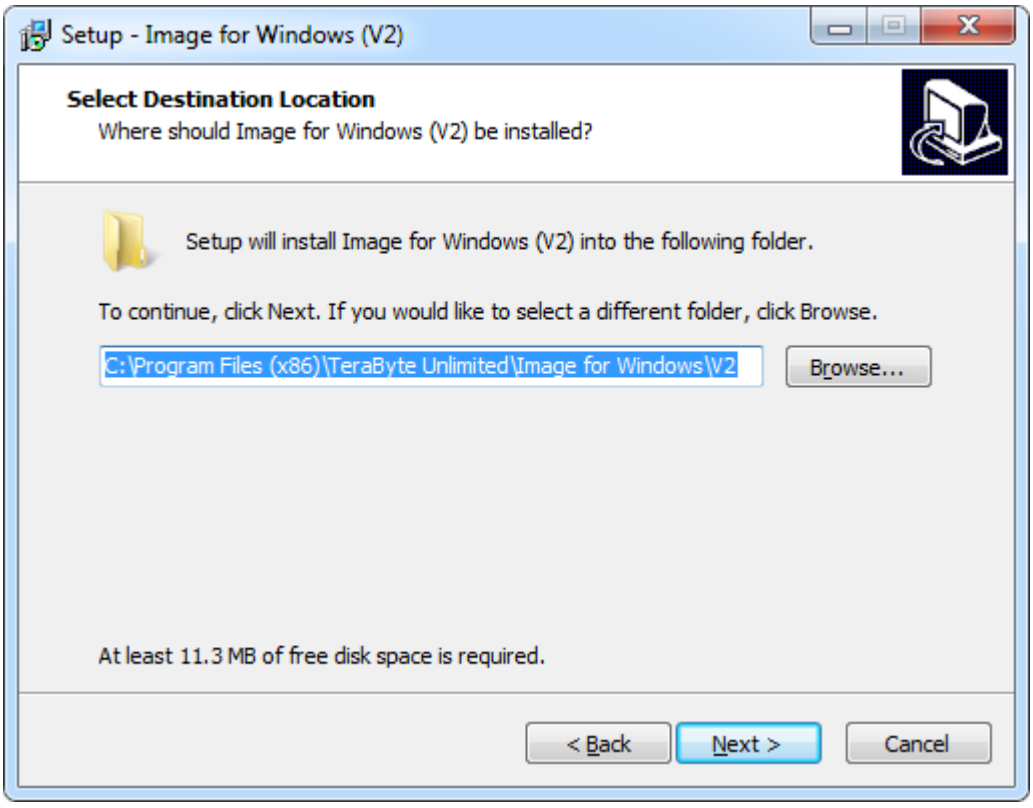

Setup - Image for Windows (V2)
Point-In-Time Technology
Image for Windows can use VSS or PHYLock.
Select the default point-in-time technology to use
VSS - Microsoft's Volume Shadow Services.
PHYLock - TeraByte's PHYLock.
< Back
Next >
Cancel

Select the Point-In-Time technology to use:

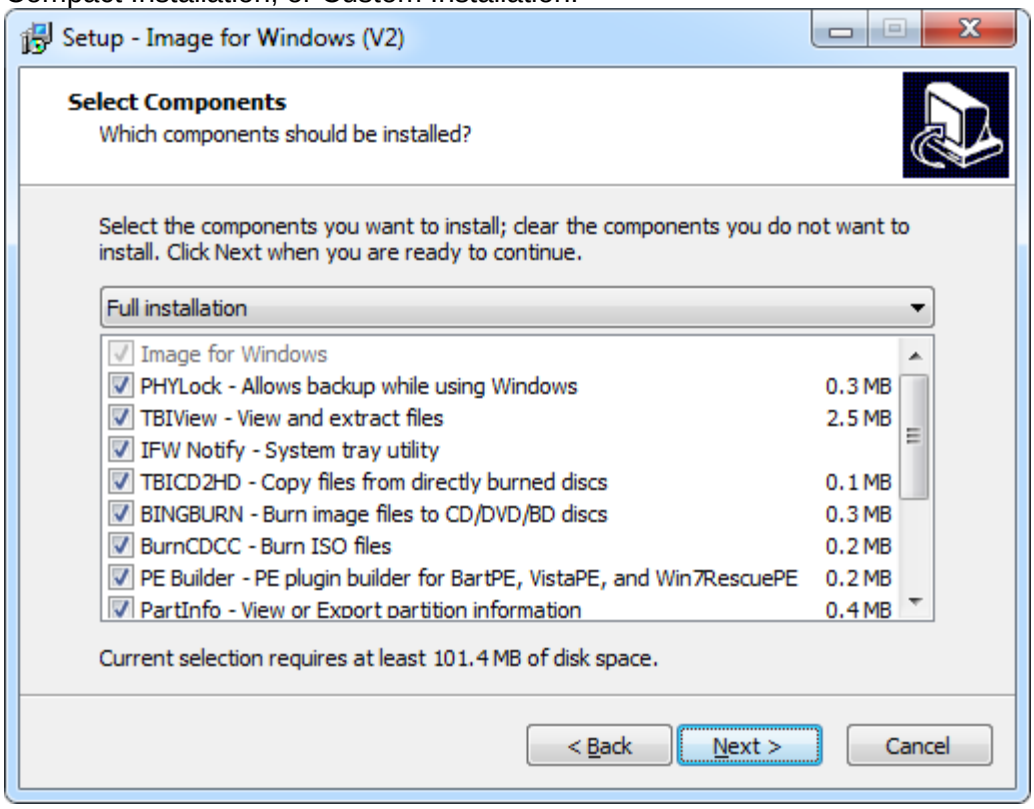
VSS: Enables the use of Microsoft's Volume Shadow Services (VSS). VSS is supported on Windows 2003 or later.

PHYLock: Enables the use of TeraByte's PHYLock. PHYLock enables Image for Windows to create a consistent, reliable backup of a partition or volume that is in use based on a point in time.

5. Click Next. The Select Destination Location window appears. To change the default folder where Image for Windows will be installed, click Browse and navigate to the appropriate folder. Otherwise, continue to the next step.


Setup - Image for Windows (V2)
Select Destination Location
Where should Image for Windows (V2) be installed?
Setup will install Image for Windows (V2) into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files (x86)\TeraByte Unlimited\Image for Windows\V2
Browse...
At least 11.3 MB of free disk space is required.
< Back
Next >
Cancel

6. Click Next. The Select Components window appears. From the drop-down menu, you can choose Full Installation (as shown in the figure below), Compact Installation, or Custom Installation.


Setup - Image for Windows (V2)
Select Components
Which components should be installed?
Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.
Full installation
Image for Windows
PHYLock - Allows backup while using Windows 0.3 MB
TBIView - View and extract files 2.5 MB
IFW Notify - System tray utility
TBICD2HD - Copy files from directly burned discs 0.1 MB
BINGBURN - Burn image files to CD/DVD/BD discs 0.3 MB
BurnCDCC - Burn ISO files 0.2 MB
PE Builder - PE plugin builder for BartPE, VistaPE, and Win7RescuePE 0.2 MB
PartInfo - View or Export partition information 0.4 MB
Current selection requires at least 101.4 MB of disk space.
< Back
Next >
Cancel

The optional components you can install include:

PHYLock: A free add-on that enables Image for Windows to create a consistent, reliable backup of a partition or volume that is in use—also called *an unlocked* partition or volume. We recommend that you install PHYLock so that you can back up a Windows volume while using it.

TBIView: A free add-on you can use to view and extract individual files from image backups you've created. Includes TBIMount.

IFW Notify: A system tray utility that provides notifications of Image for Windows operations and provides easy access to the summary log. It can also be configured to notify you if a backup hasn't completed successfully in the specified number of days.

TBICD2HD: A free command line utility you can use to copy to your hard drive TeraByte image files that were directly burned to optical discs.

BINGBURN: A free utility you can use to burn previously-created TeraByte image files to CD, DVD, or BD discs.

BurnCDCC: A free utility that provides a quick, easy way to write CD, DVD, or BD .ISO files to optical discs.

PE Builder: A free utility you can use to integrate Image for Windows into BartPE or VistaPE, which are standalone Windows environments. When booted to a Windows PE build, you can perform maintenance tasks or create or restore an image of your main Windows partition.

BartPE is a third-party product and is not included with Image for Windows. To learn more about BartPE or to download it, please visit the BartPE Builder home page at www.nu2.nu/.

PartInfo: A free utility you can use to view or export partition information. Supports MBR, EMBR, and GPT disks.

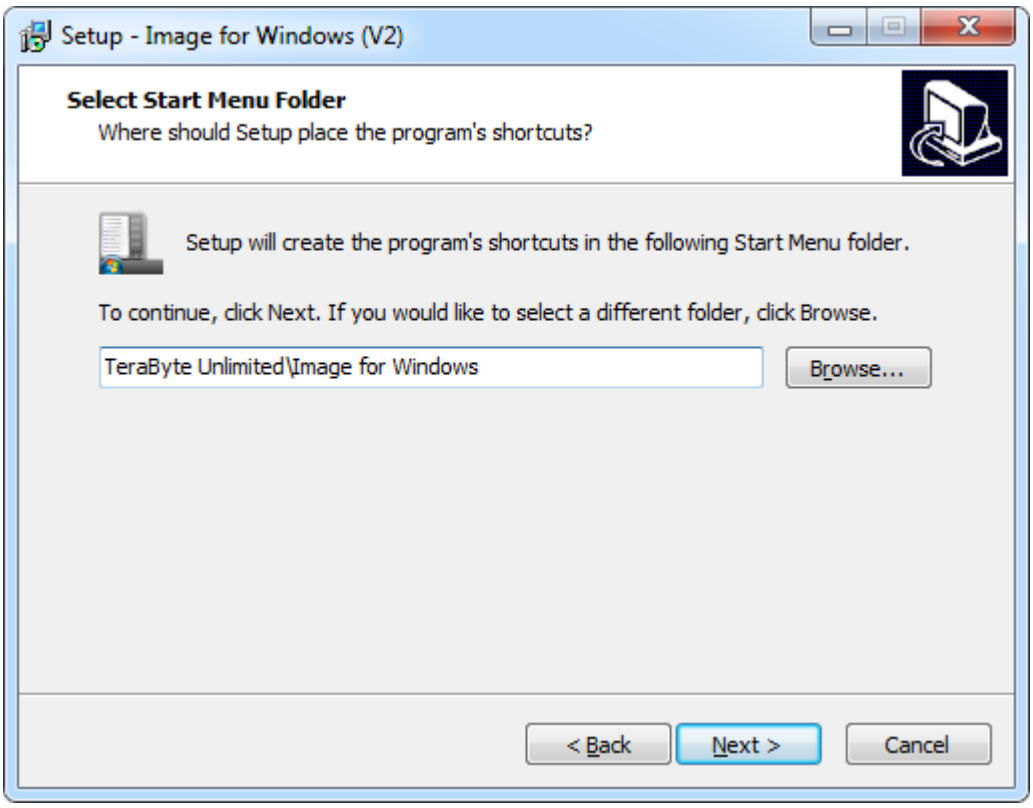
TeraByte OS Deployment Tool Suite Professional: A collection of specialized tools for IT professionals and power users. These powerful tools in the right hands have many uses such as virus and rootkit removal and repair, installation of software and drivers, and much more. *Note: This option is not available with the trial version of the program.*

Image for DOS Recovery Disk: Image for DOS is a standalone backup and restore utility that you can use to restore your Windows partition. If you choose the "Image for DOS Recovery Disk" component, you will be able to create a bootable CD/DVD disc, USB flash drive, ISO file, or floppy diskette that you can use to run Image for DOS. Please note that your purchase of Image for Windows also includes Image for DOS at no additional charge.

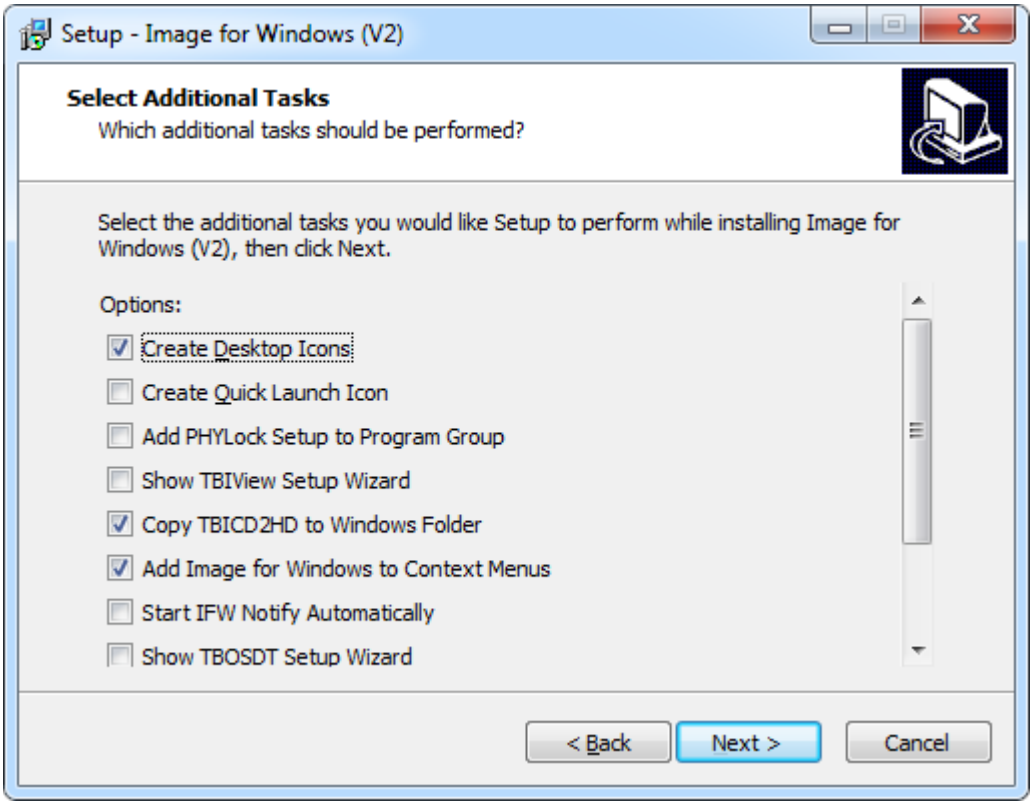
Image for Linux Recovery Disk: Image for Linux is a standalone backup and restore utility that you can use to restore your Windows partition. If you choose the "Image for Linux Recovery Disk" component, you will be able to create a bootable CD/DVD disc, USB flash drive, ISO file, or floppy diskette that you can use to run Image for Linux. Please note that your purchase of Image for Windows also includes Image for Linux at no additional charge. This option is only available if you're using the installer that includes Image for Linux.

Image for UEFI Recovery Disk: Image for UEFI is a standalone backup and restore utility that you can use to restore your Windows partition. If you choose the "Image for UEFI Recovery Disk" component, you will be able to create a bootable CD/DVD disc, USB flash drive, ISO file, or floppy diskette that you can use to run Image for UEFI. Please note that your purchase of Image for Windows also includes Image for UEFI at no additional charge. This option is only available if you're using the installer that includes Image for UEFI.

7. Click Next and the Select Start Menu Folder window appears. You can click Browse to change the Start Menu Folder or you can accept the default.


Setup - Image for Windows (V2)
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
TeraByte Unlimited\Image for Windows
Browse...
< Back
Next >
Cancel

8. Click Next and the Select Additional Tasks window appears. Check the appropriate boxes to create Desktop and/or Quick Launch toolbar icons.


Setup - Image for Windows (V2)
Select Additional Tasks
Which additional tasks should be performed?
Select the additional tasks you would like Setup to perform while installing Image for Windows (V2), then click Next.
Options:
Create Desktop Icons
Create Quick Launch Icon
Add PHYLock Setup to Program Group
Show TBIView Setup Wizard
Copy TBICD2HD to Windows Folder
Add Image for Windows to Context Menus
Start IFW Notify Automatically
Show TBOSDT Setup Wizard
< Back
Next >
Cancel

The following optional setup tasks are available:

Add PHYLock Setup to Program Group: This option simply adds a shortcut to the Image for Windows menu (under the Start menu) that will allow you to uninstall/reinstall PHYLock in the future. If you selected the PHYLock option in Step 6, it will be installed regardless of what you select here.

Show TBIView Setup Wizard: If you check this option, the TBIView setup routine runs interactively, allowing you to select the installation and Start menu folders, and you see the installation progress. If you don't check this option, TBIView setup will run silently in the background instead (assuming you opted to install TBIView in Step 6).

Copy TBICD2HD to Windows Folder: When you need to copy image files from a directly-burned CD/DVD to your hard drive, you must use TBICD2HD. By selecting this option, the TBICD2HD program is copied to your Windows folder, which is in the system path by default. Having TBICD2HD in the Windows folder allows you to run TBICD2HD easily from a command line regardless of the current directory.

Add Image for Windows to Context Menus: This option allows you to right-click on a drive in Explorer and select to create a backup of that partition. The backup will be saved in the "My Backups" folder in the user's "Documents" folder. It is recommended to move the backup image to another location after it has finished.

Start IFW Notify Automatically: The IFW Notify system tray utility will be configured to run automatically when Windows starts. The default configuration will provide notifications for backup and copy operations and warn if 30 days have passed since the last successful backup. If this option is not selected and you wish to use IFW Notify you will need to run and configure the program manually.

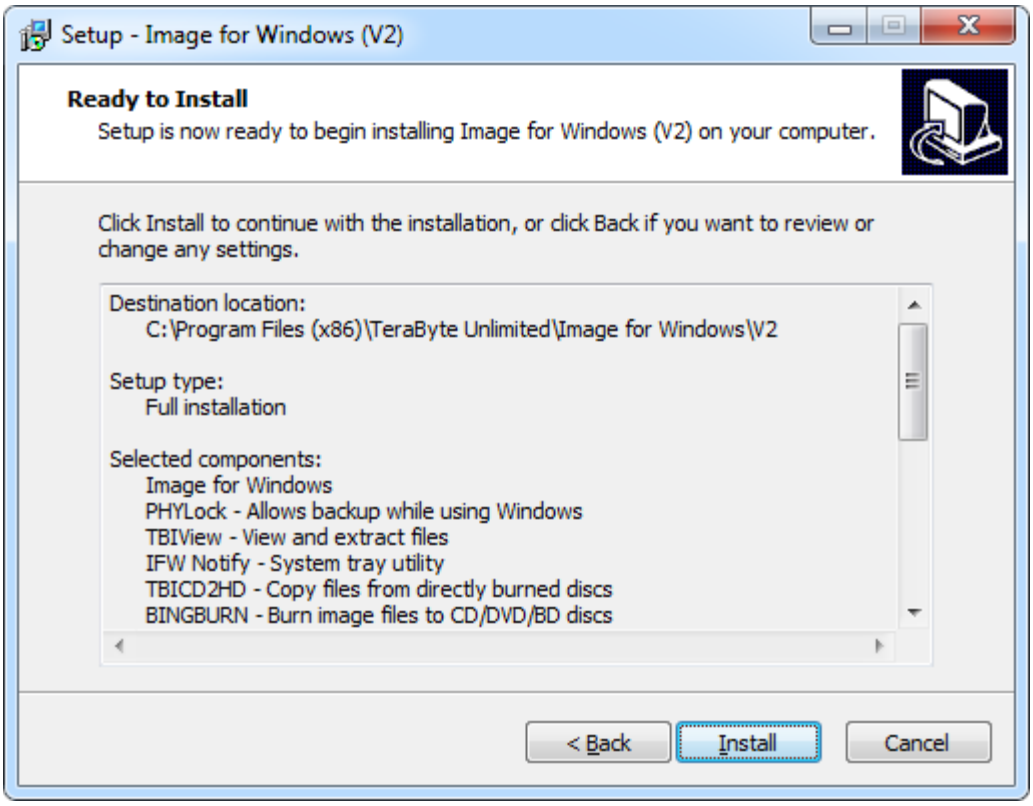
Show TBOSDT Setup Wizard: If you check this option, the TBOSDT setup routine runs interactively, allowing you to select the installation and Start menu folders, and you see the installation progress. If you don't check this option, TBOSDT setup will run silently in the background instead (assuming you opted to install TBOSDT in Step 6).

Create Image for DOS Recovery Disk: This option runs the MakeDisk utility, which helps you create a bootable Image for DOS USB flash drive, CD/DVD, ISO image, or floppy diskette. If you don't check this option, MakeDisk will not run, but the Image for DOS recovery disk files will still be installed (if you selected the applicable option in Step 6).

Create Image for Linux Recovery Disk: This option runs the MakeDisk utility, which helps you create a bootable Image for Linux USB flash drive, CD/DVD, ISO image, or floppy diskette. If you don't check this option, MakeDisk will not run, but the Image for Linux recovery media files will still be installed (if you selected the applicable option in Step 6).

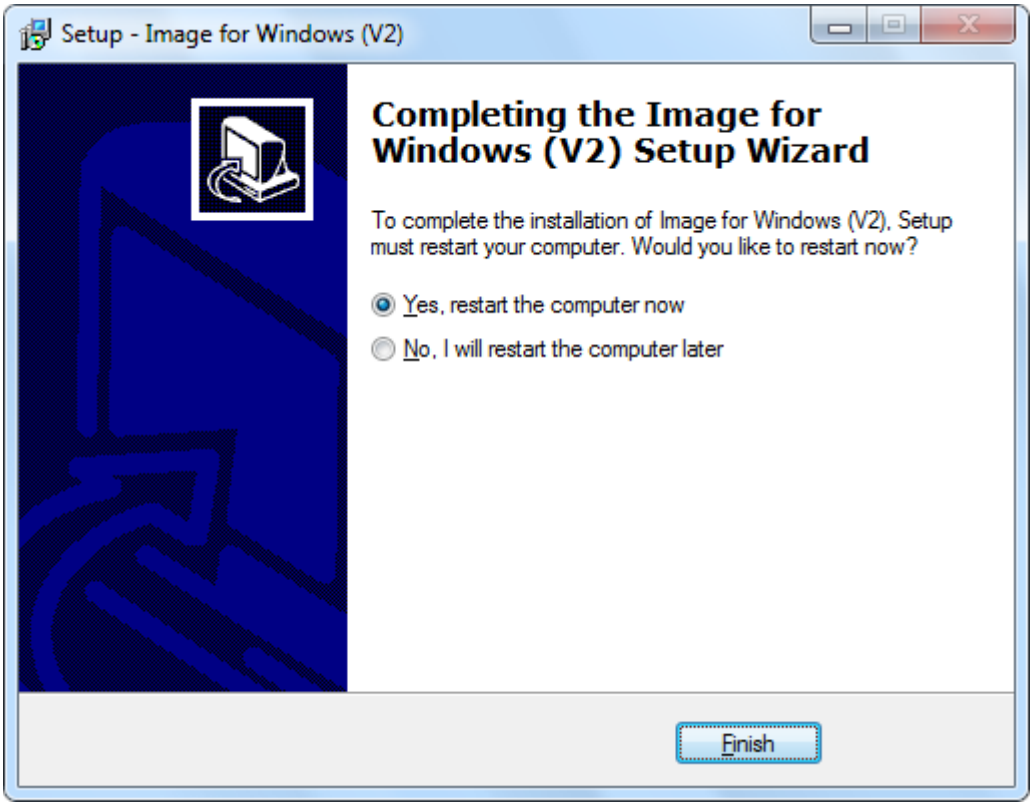
Create Image for UEFI Recovery Disk: This option runs the MakeDisk utility, which helps you create a bootable Image for UEFI USB flash drive, CD/DVD, ISO image, or floppy diskette. If you don't check this option, MakeDisk will not run, but the Image for UEFI recovery media files will still be installed (if you selected the applicable option in Step 6).

9. Click Next and the Ready to Install window appears, summarizing your choices.


Setup - Image for Windows (V2)
Ready to Install
Setup is now ready to begin installing Image for Windows (V2) on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Program Files (x86)\TeraByte Unlimited\Image for Windows\V2
Setup type:
Full installation
Selected components:
Image for Windows
PHYLock - Allows backup while using Windows
TBIView - View and extract files
IFW Notify - System tray utility
TBICD2HD - Copy files from directly burned discs
BINGBURN - Burn image files to CD/DVD/BD discs
< Back
Install
Cancel

10. Click Install and the Installing window appears. A progress bar shows installation progress. When installation completes, the final window of the Image for Windows Installation Wizard appears.

If you opted to install MakeDisk or to run the TBIView Setup Wizard, the final window of the Image for Windows Installation wizard won't appear until you complete the other tasks you selected. If you opted to install MakeDisk, skip to Step 2 of the section, "Creating a Bootable Image for DOS Disc" for detailed steps on using MakeDisk to create the Image for DOS bootable media.


Setup - Image for Windows (V2)
Completing the Image for Windows (V2) Setup Wizard
To complete the installation of Image for Windows (V2), Setup must restart your computer. Would you like to restart now?
Yes, restart the computer now
No, I will restart the computer later
Finish

11. Since the installation won't be complete until you restart your computer, we recommend that you click the "Yes, restart the computer now" option and click Finish.

If you opt not to install PHYLock, or if you already had the latest version of PHYLock installed when you started the installation, you don't need to reboot and you won't be prompted to do so.

Formulating a Backup Plan

Before you create your first backup with Image for Windows, we suggest that you formulate a backup plan. There are very few rules to follow; please consider the following ideas to help you create a backup that will help you easily recover from a disaster. For more information on backup strategies, see Appendix B: Backup Strategies on Page 199.

Consider the Destination for Your Backup

Suppose that you will be backing up around 30 GB of data. In this case, you probably will not want to store the backup on a set of CD-R/RW discs, since the resulting backup will likely require 20 discs or more (based on an expected compression ratio of 40-60%). Better options in this case would be:

* Back up directly to a set of DVD or BD discs.

* Backup to an alternate hard drive partition (and perhaps use the free add-on utility BINGBURN later to burn the backup to a set of DVD/BD discs).

* Backup to an external hard drive—the recommended alternative.

Plan your Backup with a Restore Strategy in Mind

As obvious as it sounds, we need to say it: Backing up isn't truly helpful unless you can restore the backup. So, plan not only your backup strategy but your restore strategy.

First and foremost, validate your backup to make sure that you can, if necessary, restore it.

Regardless of whether you store your backup on disc media (CD/DVD/BD), an alternate hard drive partition, or an external hard drive, you can restore by booting your computer using a recovery boot media you create using either Image for DOS or Image for Linux. That boot media automatically contains a copy of Image for DOS/Image for Linux that you can use to restore your Image for Windows backup.

If you prefer to restore with Image for Windows you can create the TBWinRE, TBWinPE, or BartPE boot media. When you boot your computer using this boot media you boot to a Windows preinstallation environment where you can use Image for Windows to restore your backup. Tutorials for creating the TBWinRE, TBWinPE, and BartPE boot media can be found on TeraByte's website.

Using either approach, your Image product can recognize USB, USB2, IEEE 1394, eSATA, and ATAPI devices where you have stored backup files without any interference on your part. Image for Windows and Image for Linux also support USB3 devices.

Note: Image can also recognize ASPI devices if you provide the ASPI driver.

Strike Your Own Balance between Convenience and Resiliency

Consider these simple ideas:

* Save your backups directly to an alternate hard drive partition or external hard drive, and then use the free utility BINGBURN to burn a secondary copy of the backup to a set of CD/DVD/BD discs. Then, if you need to restore, you can quickly and conveniently use the backup stored on the hard drive. But, if things really go wrong and the primary copy of the backup isn't available, you can fall back on the copy of the backup that you saved on CD/DVD/BD discs.

* Don't get rid of an existing set of backup discs when you create a new set. Instead, keep two or more sets of backup discs. That way, you can fall back to an older backup if something should go wrong with the newest backup.

* If you are using multiple sets of backup CD/DVD/BD discs, keep the newest set offsite, to guard against physical damage.

* Use multiple external hard drives and rotate between them. Keep at least one drive offsite.

Creating Backups with Image for Windows

When you create a backup, you can create either a full backup, a differential backup, or an incremental backup. A full backup is exactly what it sounds like—Image for Windows backs up your entire hard disk. Differential and incremental backups works in conjunction with a full backup—you create a full backup the first time and then create differential or incremental backups, which contain only changes, for subsequent backups. A differential backup will, initially, be smaller than a full backup but, as you make changes on your hard drive, the size of the differential backup will grow over time. And, because Image for Windows is a sector-based backup, the smaller file size may not be as small as you expect. An incremental backup will contain only the changes since the last full or incremental backup.

Before you make the decision concerning the type of backup you want to create, read Appendix B: Backup Strategies for a detailed explanation of full, differential, and incremental backups.

Creating a Full Backup

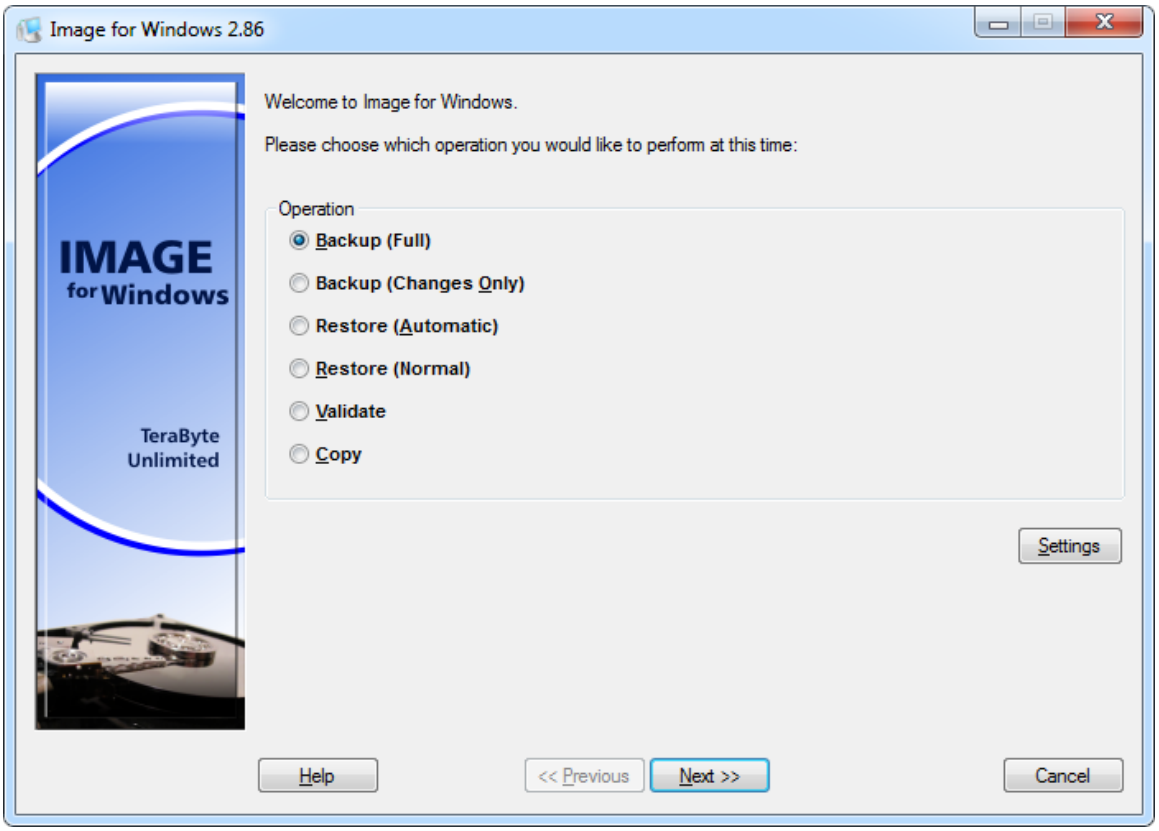
You walk through a series of windows to create a full backup. If you are backing up to disc media (CD/DVD/BD), be aware that Image for Windows can automatically overwrite CD-RW, DVD+RW, and BD-RE media. However, if you wish to use DVD-RW media, it must be fully formatted, fully blanked, or brand new before being used. To fully blank the DVD-RW media, use your burning software's "full erase" function. (The "quick erase" function will not work for this purpose.)

Tip: It's always a good idea to validate your backup as you create it.

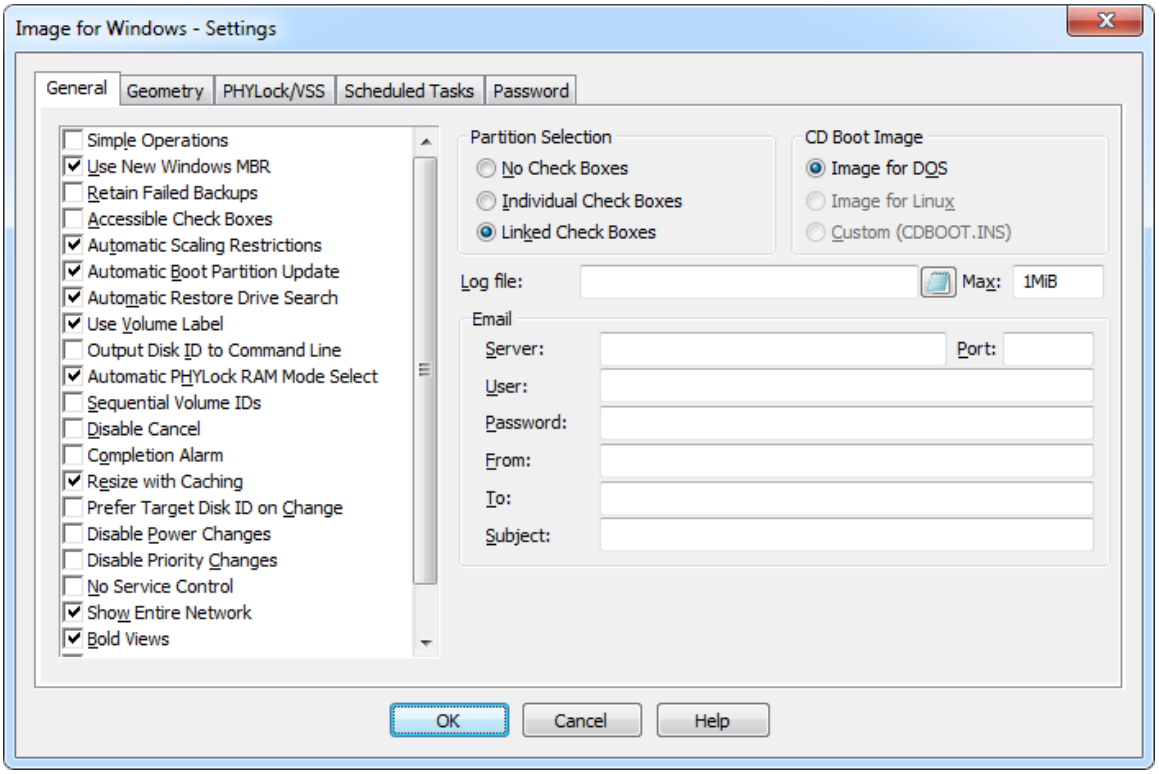
Follow these steps to create a full backup:

1. Double-click the Image for Windows icon on your desktop or launch the program from its program group on the Start menu. If you downloaded a trial version, a reminder message appears. You can click **OK** to continue evaluating, click **Enter Key** to record your registration key, or click **Buy Now!** to purchase Image for Windows.

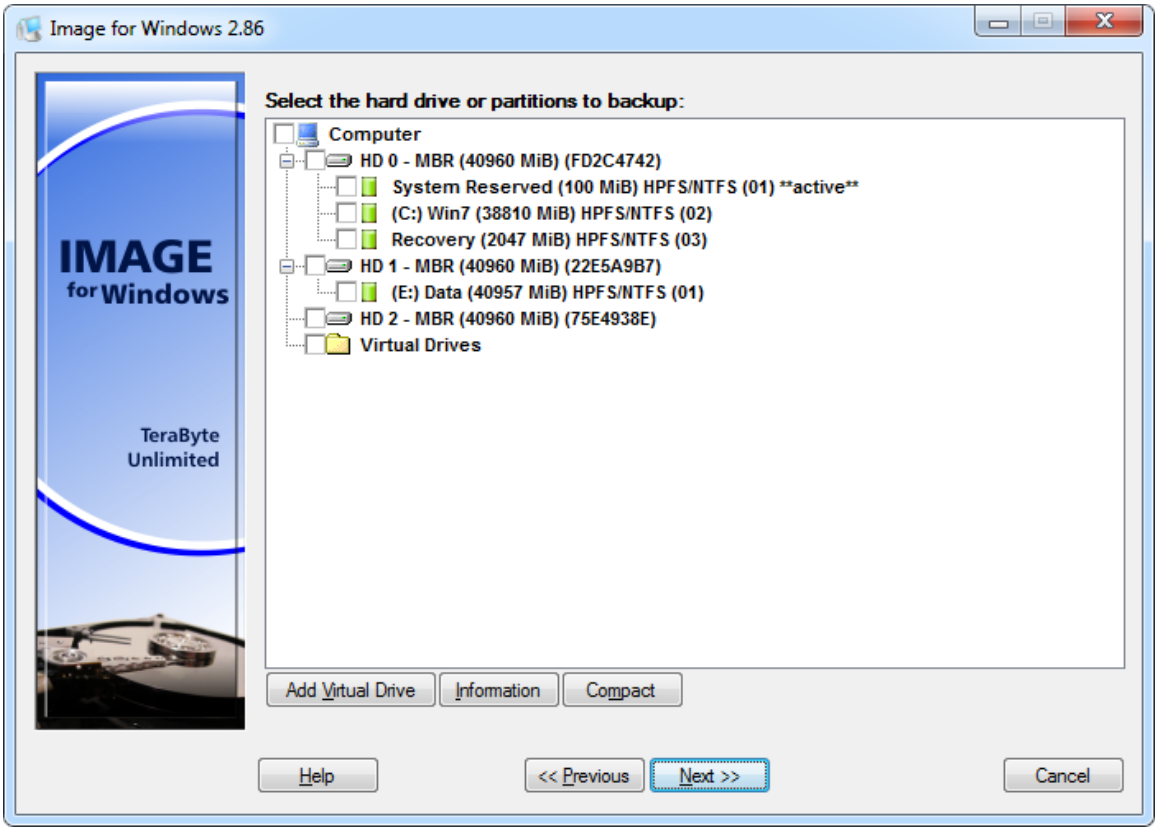
2. On the Image for Windows Welcome window, select **Backup (Full)**.



3. You can click the **Settings** button to display settings you can establish for the Image for Windows program. In the section “Understanding Options” immediately following these steps, you’ll find details on the purpose of each setting. Click OK to redisplay the Image for Windows Welcome window shown previously.



4. Click **Next**. In the window that appears, select the hard drive or partition you want to back up.



Selecting a Drive or a Partition

To back up an entire drive, check the box beside the Drive icon—HD0, HD1, etc. Remember, you can back up only one drive at a time. If you want to back up a partition, check the box beside that partition. When restoring an image of a partition, you might need to use the Update BOOT.INI, Set Active, and Write Standard MBR Code (or Restore First Track) options described in the section, "Image for Windows Restore Options."

If you individually select all partitions on a drive, Image for Windows handles the backup as individual partition backups, not as a full drive backup. You can restore an entire drive in one restore operation using individual partitions, but you can't set sizing or rescaling options or restore to a different location (sector/LBA).

Image for Windows provides a visual clue as you make your backup selections. If you select a partition, a check appears in the Drive box, but the box turns gray. If you select all partitions on a drive, the Drive box still remains gray and Image for Windows backs up partitions separately instead of storing the entire backup for the drive in one backup file.

When a partition is highlighted, the following options are available:

Information – Click the **Information** button to view the details of the partition (used space, free space, size needed to restore, etc.).

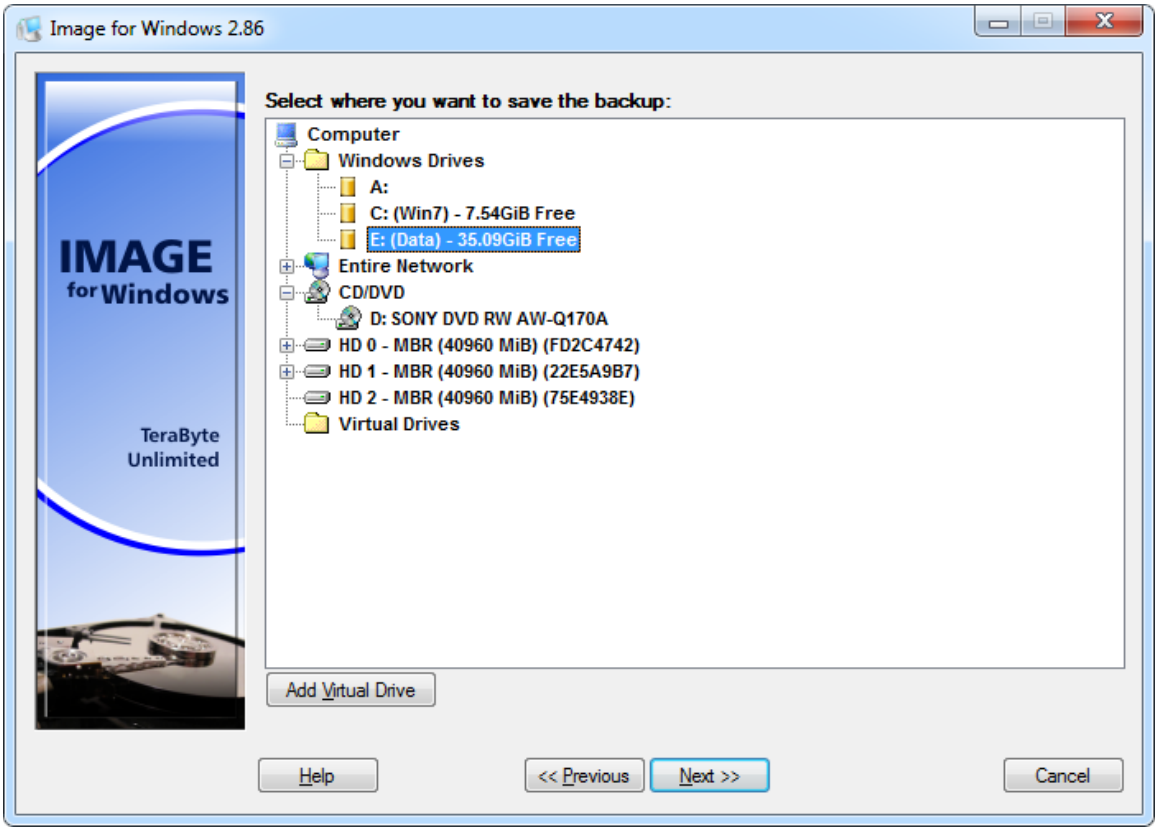
Note: You can also right-click on a drive or partition and select **Details** to view the information.

Compact – Click the **Compact** button to compact the partition's file system. FAT/FAT32 and NTFS file systems are supported. This option allows you to reduce the size required for a restore. You will be prompted to confirm the compaction and then asked for the compaction value (size in MiB).

For example, if you have a 250GB partition that contains 50GB of data and requires 150GB of space to restore and you need to restore it to a 100GB partition, you can compact the file system to under 100GB before imaging it and then restore it to the 100GB partition.

5. Click **Next**. Image for Windows searches for available locations to which you can save a backup file. In the window that appears, select the location where you want to save the backup file. You can save a backup file to CD/DVD/BD media, an external hard drive, network share, a virtual drive, etc.

Note: By default, Image for Windows searches your entire network; if the process of searching takes longer than you'd like, unselect the Show Entire Network option shown in the settings window in Step 3.



Caution: It's generally not recommended to save your image to the same partition you are backing up. If you must do this, move the backup image to another location after it has completed.

By default, Image for Windows will create a **Single File Set** backup. This type of backup is comprised of a single image, regardless of how many individual partitions you are backing up. The first file created for the image set will be named `<name>.TBI`, where `<name>` is a character string you supply. If Image for Windows creates additional files, Image for Windows will name them `<name>.1`, `<name>.2`, `<name>.3`, and so on. The number of files Image for Windows will create depends on the overall size of the backup and the **File Size** setting you choose when you set the options for the backup in a later step.

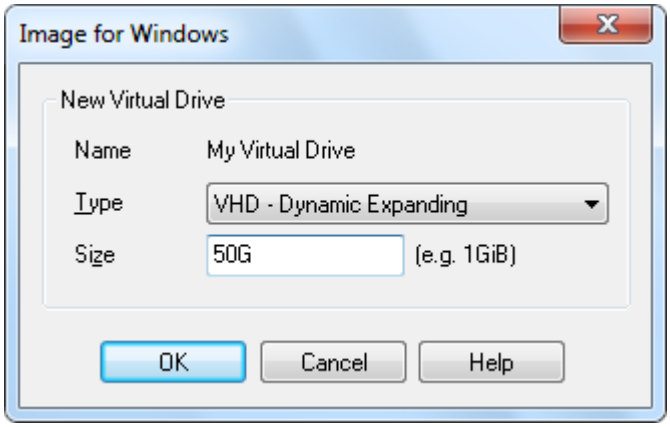
By checking the **Multi File** checkbox Image for Windows will create a **Multiple File Set** backup. This type of backup is comprised of one image for every individual partition that Image for Windows backs up. Image for Windows names the first file created for the first image set `<name>_0.TBI`, where `<name>` is a character string you supply. Image for Windows adds `_0` to identify the image file set. If Image for Windows creates additional files for the same image set, they will be named `<name>_0.1`, `<name>_0.2`, `<name>_0.3`, and so on. Image for Windows names the files of the *second* image set (i.e. the second partition included in the backup) `<name>_1.TBI`, `<name>_1.1`, `<name>_1.2`, `<name>_1.3`, and so on. Image for Windows will name subsequent image sets accordingly with _2, _3, and so on, appended to the file name.

* If you choose this option, each file Image for Windows creates represents only a single partition and you won't be able to completely restore a drive with one menu option but will have to restore each partition separately.

* The number of files Image for Windows will create for each image set depends on the size of the corresponding partition and the **File Size** setting you choose in a later step.

Virtual Drives and Image for Windows

You can use Image for Windows to back up to or restore from a single file virtual drive. In most cases, you're likely to use a virtual drive with Image for Windows if you want to back up a physical drive and then restore it to the virtual drive of a virtual machine you've created using VirtualPC, VMWare, or Hyper-V. You can add a virtual drive while working in Image for Windows. Click the Add Virtual Drive button to display an Open dialog box. In the File name box, type the name of the virtual drive you want to add and click Open. If the virtual drive name you type doesn't exist, Image for Windows displays a message asking if you want to create a file for the virtual drive. Click Yes, and Image for Windows displays this dialog box, where you can define the type and size of the virtual drive. You can specify the size in bytes by including no letters. Or, you can specify the size in Mebibytes by supplying an M or in Gibibytes by supplying a G.



Note that a new virtual drive must be partitioned and formatted before you can use it. However, you can restore an image or copy a partition into a new virtual drive without needing to partition or format it first.

You can create any of the following types of virtual drives:

- **RAW - Fixed Size** – Creates a plain (raw) file as the virtual drive. Its size is fixed and allocated with zeros on creation.[2]
- **VHD - Dynamic Expanding** – Creates a VirtualPC Dynamic Expanding virtual hard drive.[1]

- **VHD - Fixed Size** – Creates a VirtualPC Fixed Size virtual hard drive.[2]
- **VHDX - Dynamic Expanding** – Creates a Hyper-V Dynamic Expanding virtual hard drive.[1,3]
- **VHDX - Fixed Size** – Creates a Hyper-V Fixed Size virtual hard drive.[2,3]
- **VHDX - Dynamic 4KiB Sector Size** – Creates a Hyper-V Dynamic Expanding virtual hard drive with a sector size of 4KiB (4096 bytes).[1,3]
- **VHDX - Fixed Size 4KiB Sector Size** – Creates a Hyper-V Fixed Size virtual hard drive with a sector size of 4KiB (4096 bytes).[2,3]
- **VMDK - Monolithic Sparse (IDE)** – Creates a VMWare Sparse IDE virtual hard drive.[1]
- **VMDK - Monolithic Sparse (SCSI)** – Creates a VMWare Sparse SCSI virtual hard drive.[1]

[1] Dynamic expanding virtual drives append data to the file as you add data to the virtual drive. The file size starts small and grows as needed.

[2] Fixed size virtual drives allocate data for the file when it's created and the file size does not change. The file size will be the same as the virtual drive size (e.g. a 40GiB virtual drive will use 40GiB of space).

[3] For Windows caching reasons, it is highly recommended to create partitions within a VHDX file that are aligned on at least a 1MiB boundary. That is either 2048 sectors for 512 byte sized sectors or 256 sectors for 4096 byte sized sectors.

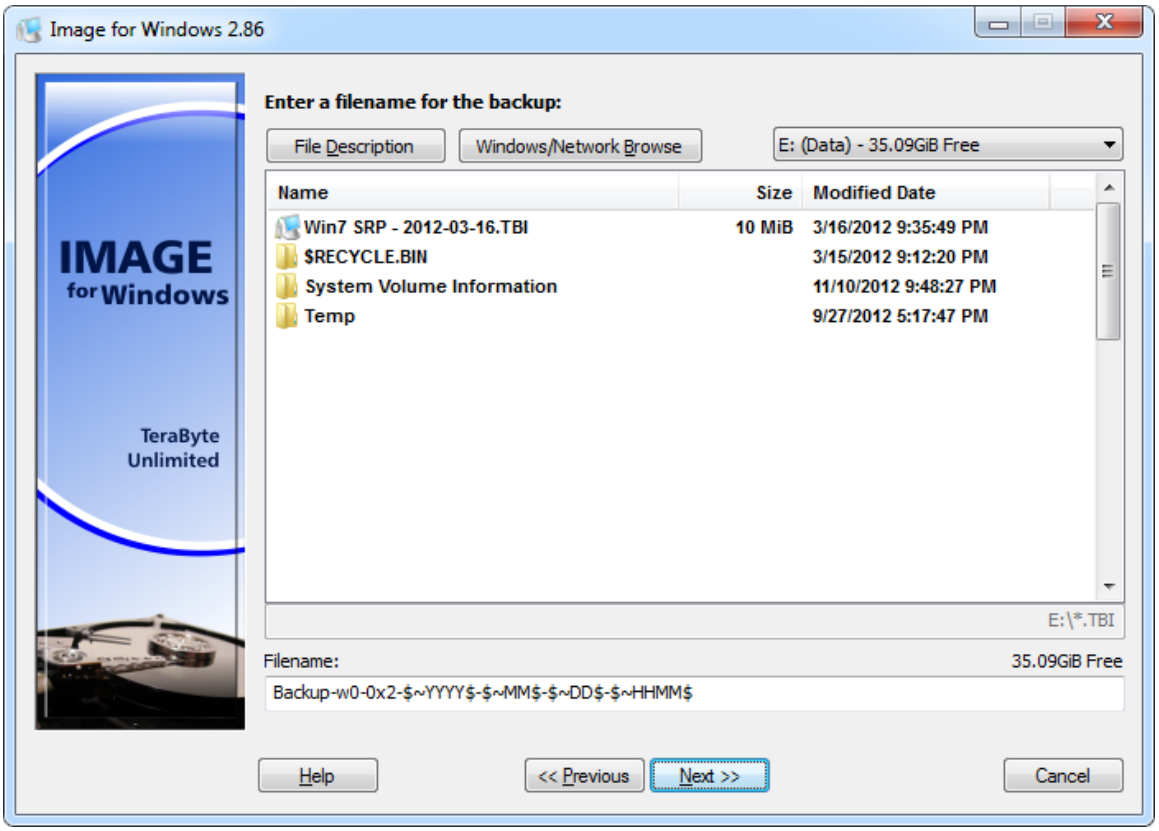
6. Click **Next**. The window that appears next depends on the target you chose in Step 5.

   * If you selected CD/DVD drive, Image for Windows displays a window that suggests a filename.

   * If you selected a standard drive or network share, the window shown below appears, also suggesting a filename. At the top of the window, open the list of drives and select the drive on which Image for Windows should save the backup file. If you want to store the backup on a drive not displayed by Image for Windows or a network drive, you can click the **Windows/Network Browse** button to navigate to the drive. You can use UNC paths.

Note: The suggested filename includes identifying information. For example, in the default name shown in the screen below, "w" stands for Windows, "0" represents the drive being backed up, and "$~YYYY$-$~MM$-$~DD$-$~HHMM$" represent the date (in 4-digit year, 2-digit month, and 2-digit day format) and time (in 2-digit hour and minute format) the backup started. If you opt to back up a partition instead

of an entire drive, the partition ID follows the drive number. You can change the file name; you don't need to include either the drive letter or the file name extension.



Tip: If you want, you can manually delete existing image files from the window shown above. Simply select the file(s) you wish to delete, and then press the Delete key. Please keep in mind that, by default, only .TBI files appear in the window, even if an image has additional files associated with it (i.e. .1, .2, etc.). To view such files, enter a file name mask (without quotes) in the Filename text box, and then press Enter. For example, you can type "backup." to view all files with a name of backup and any extension, including TBI, 1, or 2. Or, you can simply type * to view all files on the target disk.*

7. Click **Next**. In the window that appears, set the options you want Image for Windows to use during the backup. See the section, "Setting Backup Options" on Page 48 for an explanation of each option.

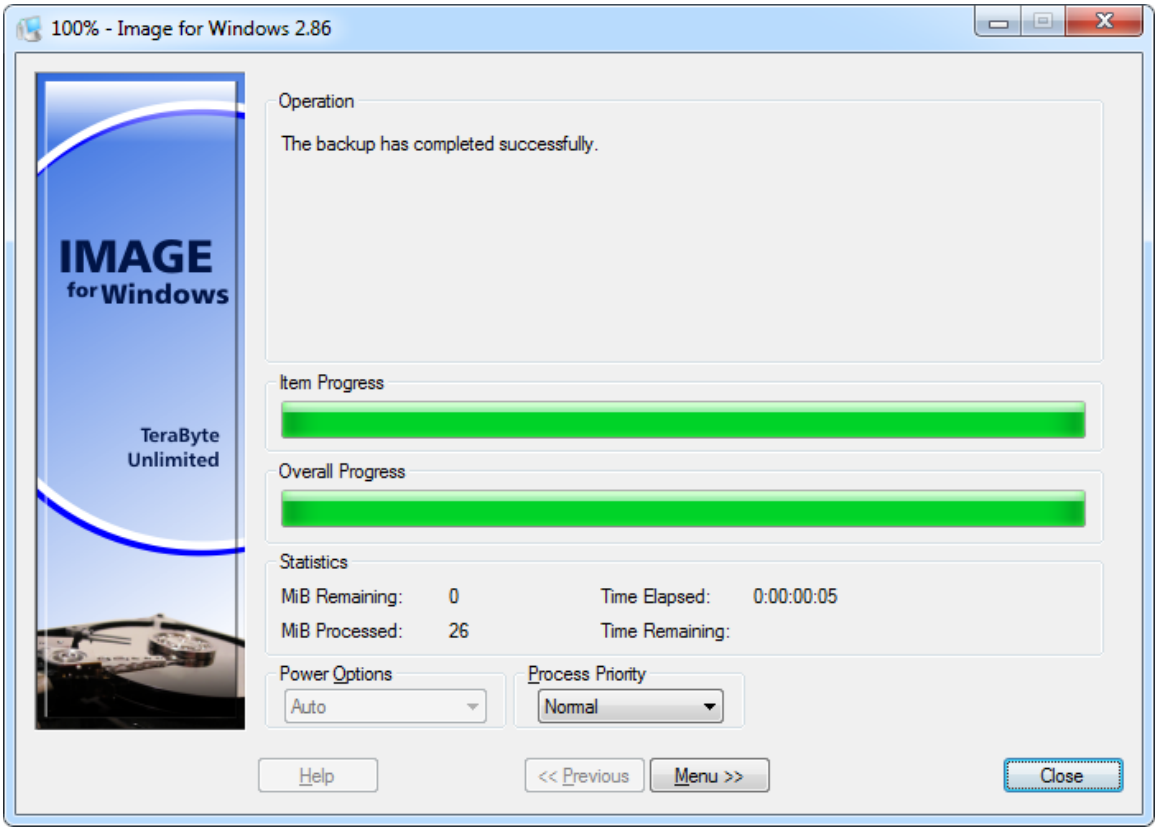
8. If you are backing up to disc media (CD/DVD/BD), insert a blank disc.

9. On the **Summary** screen that appears, select **Start** when you are ready to begin the backup process. A progress bar appears on-screen. You can interrupt the backup and validation operations at any time by clicking **Cancel** or pressing the Esc key. Image for Windows will ask you to confirm that you want to cancel before it interrupts the current operation.

   While the backup is in process, you can change the power options and

process priority options using the drop-down boxes. The default power option is Auto, which will prompt to reboot when finished if a reboot is necessary. If the selected power option is not supported by the system, the next one will be used in the following order: suspend, hibernate, shutdown. Select Exit Only to have Image for Windows exit when finished. The selected process priority will remain in effect until the program ends or is changed manually.

When Image for Windows finishes, a window appears to inform you that Image for Windows created the backup successfully. You can click **Close**.



Note: If Image for Windows reports that it cannot obtain a lock and directs you to consider using PHYLock and PHYLock is already installed, read this article and follow the instructions in it: http://www.terabyteunlimited.com/kb/article.php?id=338

If PHYLock is not installed (or not available) and VSS is not being used (e.g. you're using Image for Windows in TBWinRE), see: http://www.terabyteunlimited.com/kb/article.php?id=050

To continue you can abort, retry, or ignore the problem. Aborting will abort the backup. Retry will attempt another lock (enabling the "Attempt Aggressive Lock on Retry" option will invalidate all opened handles to the volume and try to force dismount it before locking – this may result in lost data). Ignore will attempt to force all open handles off the partition and continue with the backup without locking the partition.

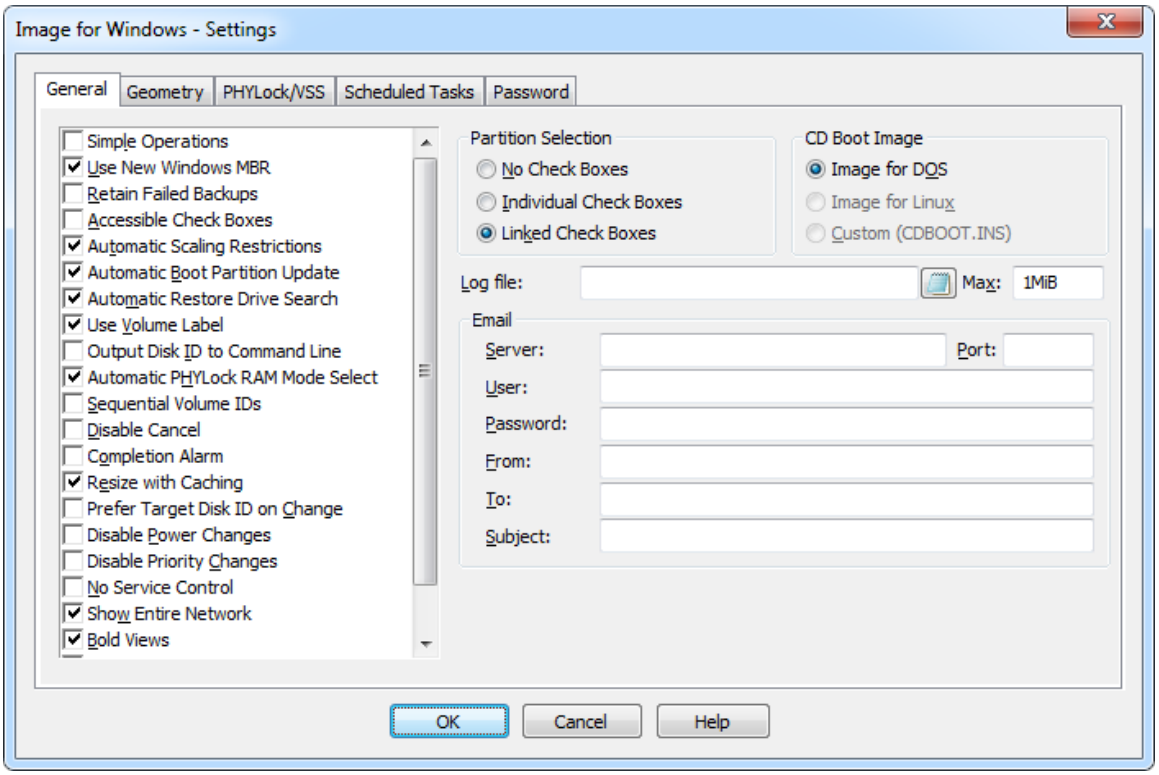
Understanding Options

You can set program options for Image for Windows as well as options you want in effect during the backup.

Setting Image for Windows Program Options

The options you can set for Image for Windows and for PHYLock are really one-time settings. That is, review them and make changes only if necessary. Once you establish a set of options that works for you, you don't need to make changes each time you run Image for Windows.

General Settings



Simple Operations – Enable this option to have Image for Windows automatically handle most options for you. You simply choose which physical drive you want to back up and, if needed, which drive you want to save to – the target storage area is automatically maintained and files are deleted as needed when it runs out of free space. Backup, Restore, Validate, and Copy are available in Simple Operations mode.

Use New Windows MBR – Windows Vista and later tied the kernel loader to the MBR code such that using previous MBR code may not allow Windows Vista or later to boot on certain machines. Enable this option to have Image for Windows use the code base compatible with Windows Vista or later. The new MBR code will

continue to boot older OSes with the exception of some (rare) configurations using Win9x on FAT32.

Retain Failed Backups – If you enable this option and a backup operation fails, Image for Windows won't delete the files from the failed backup.

Accessible Check Boxes – Changes the checklist boxes to be compatible with screen readers.

Automatic Scaling Restrictions – If this option is enabled, Image for Windows will restrict the scaling of partitions which are the smaller of 15GiB or 1/8 the drive size. Using this option is an easy way to avoid scaling system reserved, recovery, and utility partitions to larger sizes when upgrading to a larger drive.

Automatic Boot Partition Update – If this option is enabled, Image for Windows will automatically update the boot partition (including an EFI system partition) when a full drive image is restored. When enabled, the **Update Boot Partition** option will not be displayed when restoring a full drive image.

Automatic Restore Drive Search – Select to enable Image for Windows to search for the destination drive using the disk signature or GUID when performing an automatic restore (virtual drives will not be searched). If a match isn't found or if this option is not enabled, the drive number of the backed up drive will be used.

Use Volume Label – If you enable this option, Image for Windows will use the volume label instead of the name in the MPT for FAT/FAT32/NTFS/HPFS partition names, regardless of whether an EMBR exists.

Output Disk ID to Command Line – Select to enable command line output and relevant log entries to use the Disk ID (NT Signature or GUID) instead of drive numbers where the drive has an ID and the ID is unique. Specifying the Disk ID instead of the drive number may be more stable (especially for setup of scheduling backups) since Windows may reorder drives at boot.

Automatic PHYLock RAM Mode Select – Disables VSS and PHYLock Disk Mode (forcing PHYLock RAM Mode) when a **Backup Unused Sectors** or **Copy Unused Sectors** operation is being performed. This option does not enable PHYLock if PHYLock is disabled. Forcing RAM mode prevents a cache file from being created on the source partition(s), which may be desirable when backing up or copying unused sectors. This option is enabled by default.

Sequential Volume IDs – Changes the ID used for volumes to be numbered sequentially within the extended partition instead of using the normal ID (which can appear random).

Disable Cancel – Check this box to disable the Cancel button while Image for Windows backs up, restores, copies, or validates.

Completion Alarm – Checking this option will enable an audible alarm upon completion of an operation, errors, or when user interaction is required (insert media, etc.).

Resize with Caching – Enable this option to reduce the time required to resize a partition by using a cache.

Prefer Target Disk ID on Change – When enabled the **Change Disk ID and GUIDs** option will attempt to use the existing target drive ID/GUID instead of generating a random ID. This is useful when scheduling drive copy operations that use the /csig option and use the disk ID to identify the drive instead of the drive number.

Disable Power Changes – Check this box to disable the Power Options combo box while Image for Windows backs up, restores, copies, or validates.

Disable Priority Changes – Check this box to disable the Process Priority combo box while Image for Windows backs up, restores, copies, or validates.

No Service Control – Check this box to have Image for Windows ignore the services.ins file. See the section, “Image for Windows and Windows Services” on Page 123 for details on using the services.ins file to let Image for Windows control the services running under Windows.

Show Entire Network – This option determines whether the Entire Network item appears in the window where you select a location to back up or use to save backup files. When you enable this option, Image for Windows searches the network for servers, shares, drives, and partitions. If you find that the search takes longer than you’d like, disable this option.

Bold Views – Select to enable using bold fonts on certain radio buttons, tree views, and list views.

Use Windows FS Support – This option allows Image for Windows to back up or copy used areas of certain File Systems supported by Windows but not directly by Image for Windows. While it's able to access only used areas for a smaller and faster backup or copy, it does not allow resizing or file exclusions of those volumes. As of this writing, ReFS is the only file system supported by this option.

Delete Restore Destination – Enable this option to have Image for Windows delete the target partition before restoring or copying to it. Depending on the partition being restored or copied to a GPT drive, this may be necessary to allow the operation to complete successfully with byte-for-byte validation. Otherwise, if Windows makes changes to the existing target partition while in the locked state byte-for-byte validation will fail.

Partition Selection – These options control how Image for Windows allows partitions to be selected. The default is *Linked Check Boxes*.

CD Boot Image – This option allows you to choose which product you want bootable on any backups directly stored on CD/DVD. It does this by using variations of the CDBOOT.INS file. See the Image for DOS/Linux manuals for details on CDBOOT.INS.

Log File – Enter a path and file name for the log file you want Image for Windows to maintain. Don't add quotes. If you leave this blank, Image for Windows creates the log file, `IFW.LOG`, in the same folder where you installed `imagew.exe`; the default location is "C:\Program Files\TeraByte Unlimited\Image for Windows\V2". You can enable or disable logging using the "Log Results to File" option (please refer to the section below, "Setting Backup Options"). Clicking the Notepad button will display the current log file using Notepad.

Max (Log File Maximum Size) – Enter the maximum size for the IFW log file. You can specify bytes, Kibibytes (KiB), or Mebibytes (MiB) for the value. Decimal values (e.g. 2.5MiB) are supported. For example, to limit the log file to 32KiB you can specify `32KiB` or `32768`. Data will be removed from the beginning of the log file as necessary to enforce the size. Note: If you specify a size smaller than the current log file size, the new size will not take effect until the log is written to or IFW is closed. The default maximum size is 1MiB.

Email – Use this group of options to provide information necessary to have Image for Windows email the results of an operation. This causes the email to be sent even if logging is disabled. However, if an operation never starts (including a `LogIn` failure) an email is not sent.

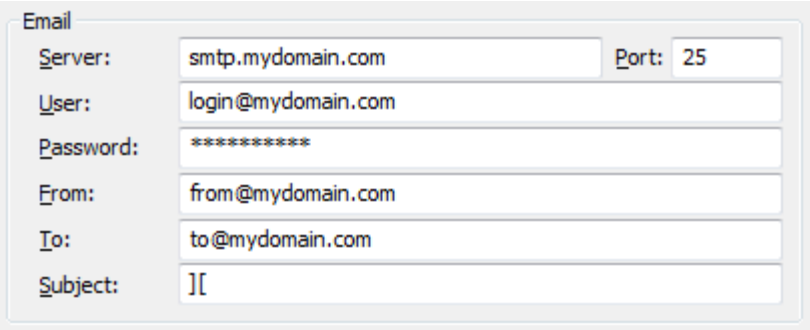
The **Server**, **From**, and **To** values are required. The **Port**, **User**, **Password**, and **Subject** values are optional.

If the **Subject** is net set, Image for Windows determines the text for the subject. The subject can be customized for success, failure, or both by inserting the][characters (brackets) into the subject. The text before][is the success text; the text after is for a failure. Additionally, you can include the place holder ~ec~, which is replaced by the error code (otherwise, Image for Windows appends the completion code text to the subject).

You can also specify a stored password (configure in Settings or with the **/login:** option) by using the following format (where *name* is the stored password name for the login):

{#*name*#}

If SSL is required, please see the KB article Sending Emails from Image for Windows to Servers that Require SSL for details.



Examples are shown below:

Using default subject text:

```
Subject: ][
```

Using custom failure subject text:

```
Subject: ][IFW Backup Failed (Error ~ec~)
```

Using custom success/failure subject text, default port, and a stored password:

```
Port: (leave blank)
Password: {#loginname#}
Subject: IFW Backup Completed][IFW Backup Failed (Error ~ec~)
```

Using the default subject text (as used by version 2.71 and earlier):

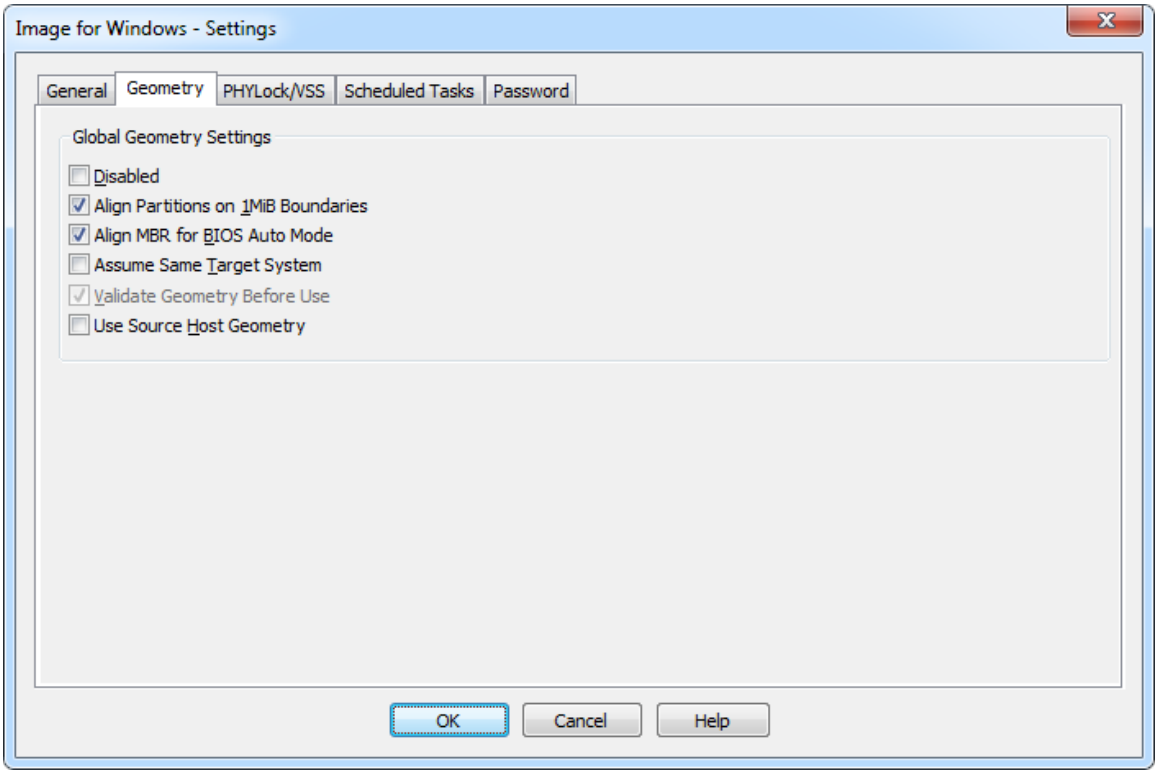
```
Subject: (leave blank)
```

Using the custom subject text (as used by version 2.71 and earlier):

```
Subject: IFW Operation Result ~ec~
```

Note: Emails will not be sent if using Log Level 10 (`LogLevel=10`) or higher unless logging is disabled for the operation.

Geometry Settings



The **Global Geometry Settings** are used to control the geometry options for the target drive of copy and restore operations. These global options offer a convenient way to control how the program sets up the target drive. They only apply to interactive sessions. Command line restores always require specific options on the command line.

Disabled – Check this box to disable the global geometry settings and revert to using program defaults or drive specific overrides equivalent to versions prior to 2.52.

Align Partitions on 1MiB Boundaries – This option provides a convenient way to enable 1MiB partition alignment for all drives (drives with 512 byte sectors will be aligned on 2048 sectors; drives with 4096 byte sectors will be aligned on 256 sectors). This is popular with users of SSD type drives. It is the equivalent to enabling the individual overrides *Align on 1MiB Boundaries, Align MBR Ending HS, Align MBR HS when Truncated*, and disabling *Align on End*.

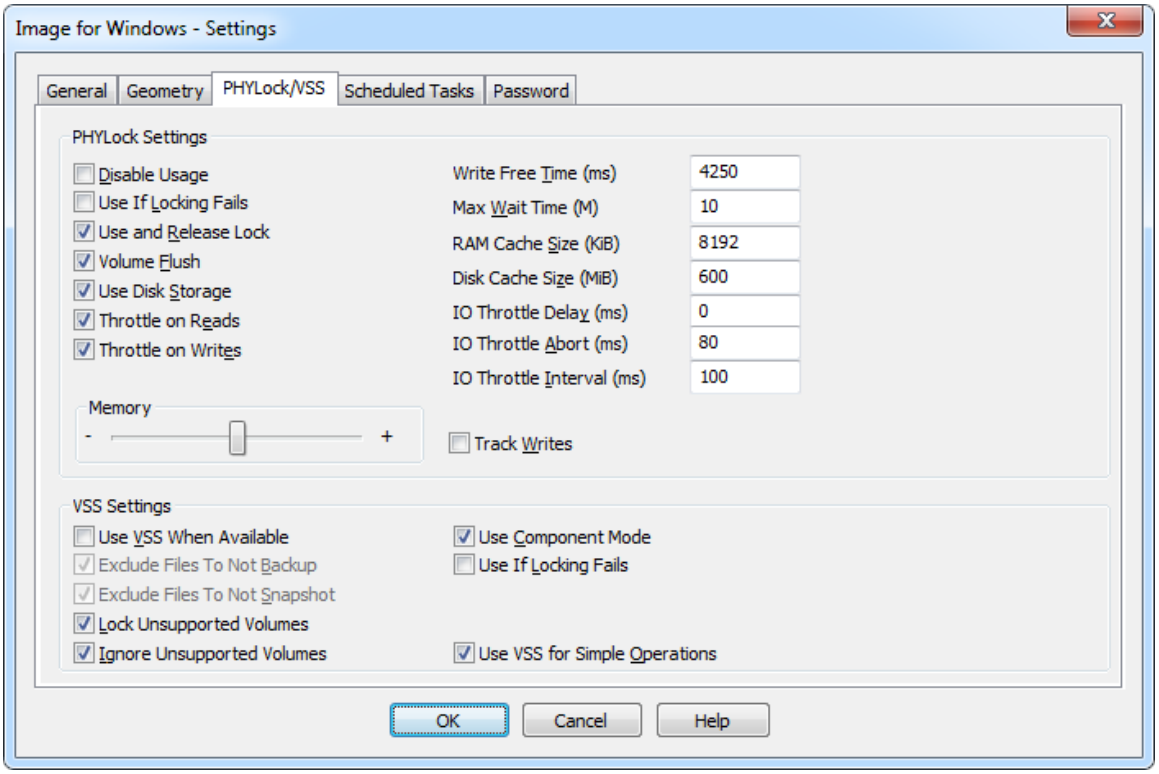
Align MBR for BIOS Auto Mode – This option is enabled by default to prevent problems with unaligned partitions on systems with their BIOS using Auto Mode. Many newer systems use auto mode by default, and some even don't have an option to turn it off. This is equivalent to enabling the individual overrides *Align MBR Ending HS* and *Align MBR HS when Truncated*.

Assume Same Target System – Enable this option to prevent problems where users restore an image from another system to a drive that will be put back in the other system. For example, the hard drive from PC-A is backed up; PC-B is used to restore to a new hard; that new drive is placed back in PC-A. Without this option enabled, Image for Windows would setup the partition to properly boot on the hard drive for PC-B which can sometimes (not always) be a problem when the hard drive is going back to PC-A. This option solves that and is equivalent to the individual *Use MBR Geometry* override.

Validate Geometry Before Use – This option is used to ensure that the geometry from the MBR on the original system is aligned to known standards before accepting it for use. It only applies when *Assume Same Target System* is enabled

Use Source Host Geometry – This option is the global equivalent to the individual *Use Original Geometry* override.

PHYLock/VSS Settings



PHYLock is an optional software component for Windows NT/2000/XP/2003, Vista, Windows 7, and Windows 8 that enables Image for Windows to create a consistent, reliable backup of a partition or volume that is in use based on a point in time. To back up a Windows partition while you are using that partition, you need to use PHYLock.

By default, PHYLock settings are saved in the registry and may be stored separately for the 32-bit and 64-bit versions of Image for Windows (see the command line option **/altregview** for details). For example, to change a PHYLock setting in both versions you may need to run each version and make the setting change.

Note: Image for Windows attempts to pick a "clean" point in time. Like all backup software packages that back up a partition or volume that is in use, Image for Windows cannot guarantee that all programs, internal caches, and other processes are in a clean state.

If you don't enable any of the options listed below, then Image for Windows will use PHYLock if you installed it.

Disable Usage – Check this box if you do not want to use PHYLock, even if you installed it.

Use If Locking Fails – Check this box to have Image for Windows use PHYLock if Image for Windows cannot obtain a normal lock on the partition you are trying to back up.

Use and Release Lock – Check this box to have Image for Windows attempt a normal lock and then use PHYLock even if Image for Windows obtained the lock. If Image for Windows obtained a normal lock, Image for Windows releases the lock after enabling PHYLock.

Volume Flush – Check this box to have Image for Windows attempt to force Windows to clear the volume's cache buffers. You can't hurt anything if you check this box.

Use Disk Storage – Check this box to have PHYLock use hard disk storage in addition to memory, up to the limit specified in the Disk Cache Size setting. Note that even if you check this box, PHYLock may sometimes run in RAM mode. It's recommended that you leave this option checked.

Due to fast compression and the design of low level storage drivers, you may experience slow response times using applications during backup operations. This slowness is actually caused by IO being delayed on slower traditional spinning hard drives and not CPU utilization. **IO throttling** was introduced to alleviate this condition at the cost of potentially slowing down the backup operation. IO throttling is currently only used when PHYLock is active.

Note: The default timer in Windows has a resolution of 10ms. This means option values like 5ms, 12ms, etc.. really mean something more like 10ms or 20ms.

Throttle on Reads – Check this box to enable IO throttling on disk reads.

Throttle on Writes – Check this box to enable IO throttling on disk writes.

Memory – Use this option to control the amount of memory PHYLock allocates to its internal tracking buffers. The furthest right location on the slider uses the most memory and covers worse case scenarios. The furthest left location uses the least amount of memory and covers 1/8 of worse case. The other two positions use 1/4 and 1/2 of worse case scenarios respectively. If you receive an error saying that PHYLock requires more memory or that it failed to cache changes and you've already increased the disk cache, try increasing this setting. Note that if PHYLock won't start due to not enough memory, you may have to decease this setting or the RAM cache.

Write Free Time (ms) – In this box, type the amount of time, in milliseconds, that must pass before PHYLock becomes enabled. During this time, you cannot update the backup source partition contents. You should try to keep the value above 1250; the default value is 4250.

Max Wait Time (M) – In this box, type the maximum amount of time, in minutes, that you want PHYLock to wait for the Write Free Time to occur before forcing the backup to start. Make sure you type an amount other than zero; if you type 0, PHYLock waits indefinitely

RAM Cache Size (KB) – In this box, type the size of the internal cache, in kilobytes, you want PHYLock to use to maintain data consistency. The default value is 8192 (8192 KB / 1024 = 8 MB). You should not use a value below 2048 for this setting, even if you enabled the **Use Disk Storage** setting.

If you back up an NTFS partition and you *don't check* the Use Disk Storage box, then you need to weigh the value of the RAM Cache Size (KB) setting against the size of the NTFS log. You should keep the value of the RAM Cache Size above the size of the NTFS log by increasing the RAM Cache Size value, reducing the size of the NTFS log, or both.

You can check the size of the NTFS log file using the command line:

CHKDSK <drive letter>: /L

The same command line will show you the default NTFS log size for the volume in question. You can change the size of the NTFS log using:

CHKDSK <drive letter>: /L:<log file size (KB)>

Do not set the size of the NTFS log to a value lower than 4096 KB. If you make the NTFS log too small, your computer may experience performance degradation or it may fail to boot. Again, you only need to consider the log file size when you're not using the Use Disk Storage option.

Disk Cache Size (MB) – In this box, type the amount of hard disk space Image for Windows should allocate to PHYLock when you also check the **Use Disk Storage** box.

IO Throttle Delay (ms) – This value controls the amount of time the application delays after allowing pending IO to occur. This value should be kept low otherwise the program could be doing nothing if the IO completes before this delay expires. The only time you may want to extend it is if you expect multiple IO requests to occur that you want the application to wait for to prevent potential thrashing. This option is relevant only if IO throttling is enabled (**Throttle on Reads/Writes**). (Default: 0, Max: 20)

IO Throttle Abort (ms) – The abort value is the maximum amount of time to wait for other IO to complete before continuing, even if more IO is pending. This value will be adjusted to be a multiple (rounded up) of the Delay value above. If set to zero then throttling is disabled. This option is relevant only if IO throttling is enabled (**Throttle on Reads/Writes**). (Default: 80, Max: 500)

IO Throttle Interval (ms) – This controls how often the throttle may engage. Lower values throttle more often for better response time of other applications, but at the cost of slowing down the backup. Larger values throttle less often for a faster backup, but at the cost of potentially slowing down other applications. Setting this value to zero disables IO Throttling. This option is relevant only if IO throttling is enabled (**Throttle on Reads/Writes**). (Default: 100)

Track Writes – Enables PHYLock to track writes so that incremental backups complete quickly without having to read and check all data for changes. This option is part of PHYLock but not affected by the **Disable Usage** option since it also applies using VSS. The tracking is at a disk level so it only makes sense to use this on entire drive backups or where you only back up the same partitions continually and where the backups occur without a reboot. Since PHYLock is close to the drive on the driver stack, it is able to track writes that may bypass the filesystem, however it cannot track writes that occur from any driver closer to the drive than itself (as rare as that may be). In addition, it can only track writes that have been sent to the drive and would not detect changes that are cached. Therefore it's not recommended to use this option, but it is here for those that want the option of fast incremental backups. As always, don't let your incremental chain get too long or you'll eventually run out of file handles or memory (including those limits that may apply to the restore environment).

The **VSS Settings** group of options allow enabling VSS and configuring other VSS specific settings.

Use VSS When Available – This option will cause Image for Windows to try using Microsoft's Volume Shadow Copy Services before using PHYLock on Windows 2003 or later. If VSS is unable to be started then PHYLock may be used.

Exclude Files To Not Backup – If you have configured the VSS **FilesNotToBackup** registry key, you can enable this option to have Image for Windows exclude those files/folders when creating a backup image or copying a partition. This option applies only when VSS is enabled and used.

Exclude Files To Not Snapshot – If you have configured the VSS **FilesNotToSnapshot** registry key, you can enable this option to have Image for Windows exclude those files/folders when creating a backup image or copying a partition. This option applies only when VSS is enabled and used.

Lock Unsupported Volumes – Enable to have Image for Windows attempt to lock a partition when its volume name is in a format unsupported by VSS. If the lock fails and the *Ignore Unsupported Volumes* option is enabled, the partition will be ignored. Otherwise, PHYLock may be used. This option applies only when VSS is enabled and used.

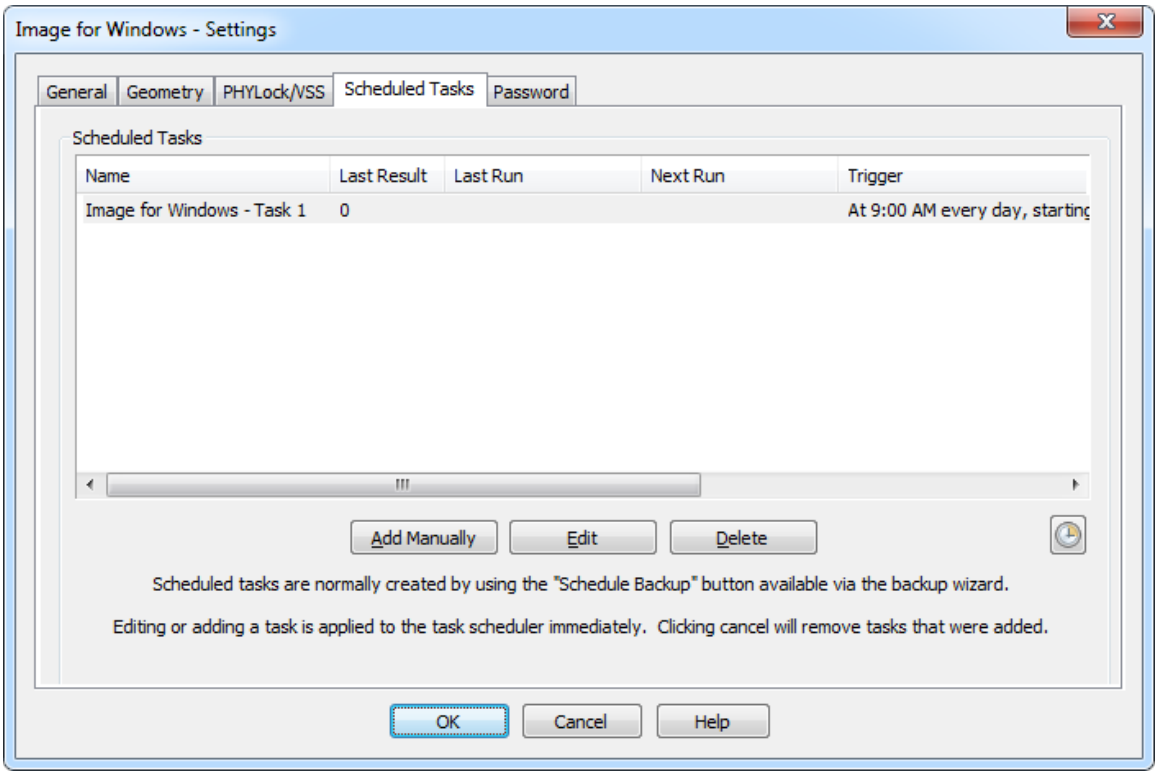
Ignore Unsupported Volumes – Enable to have Image for Windows ignore a partition when its volume name is in a format unsupported by VSS. The partition will be backed up or copied in the unlocked state. If any changes are made to the data on the partition during the operation and *Validate Byte-for-Byte* is used the validation will fail. This option applies only when VSS is enabled and used. Additionally, it will be used for applicable Simple Operations mode procedures, if enabled.

Use Component Mode – Enabling this option will only enable VSS components that are needed based on the partitions being backed up or copied. When disabled, all components are used automatically.

Use If Locking Fails – Attempt a normal lock and only add the partition to the VSS snapshot if locking fails. The partition remains locked during the backup or copy operation.

Use VSS for Simple Operations – Attempts to use VSS for the backup or copy when Simple Operations mode is enabled. The *Exclude Files To Not Backup* and *Exclude Files To Not Snapshot* options are automatically used with Simple Operations when VSS is used.

Scheduled Tasks



Use the **Scheduled Tasks** tab to manage your scheduled tasks. New tasks can be created manually or, more easily, by clicking the **Schedule Backup** button in the backup wizard. Existing tasks can be edited or deleted by selecting them and clicking the appropriate button. New manually added tasks will be removed (not saved) if the **Cancel** button is clicked. Clicking the Task Scheduler button will open the Windows Task Scheduler.

Password Settings

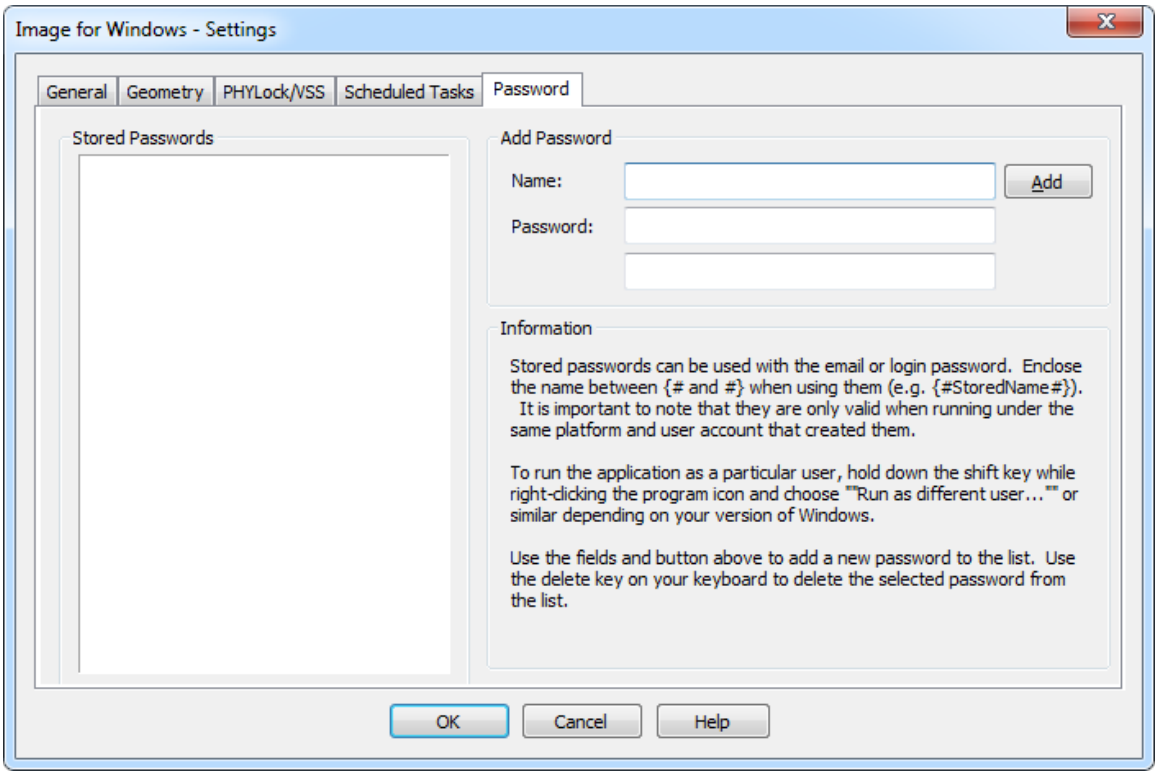


Image for Windows - Settings
General
Geometry
PHYLock/VSS
Scheduled Tasks
Password
Stored Passwords
Add Password
Name:
Add
Password:
Information
Stored passwords can be used with the email or login password. Enclose the name between {# and #} when using them (e.g. {#StoredName#}). It is important to note that they are only valid when running under the same platform and user account that created them.
To run the application as a particular user, hold down the shift key while right-clicking the program icon and choose ""Run as different user..."" or similar depending on your version of Windows.
Use the fields and button above to add a new password to the list. Use the delete key on your keyboard to delete the selected password from the list.
OK
Cancel
Help

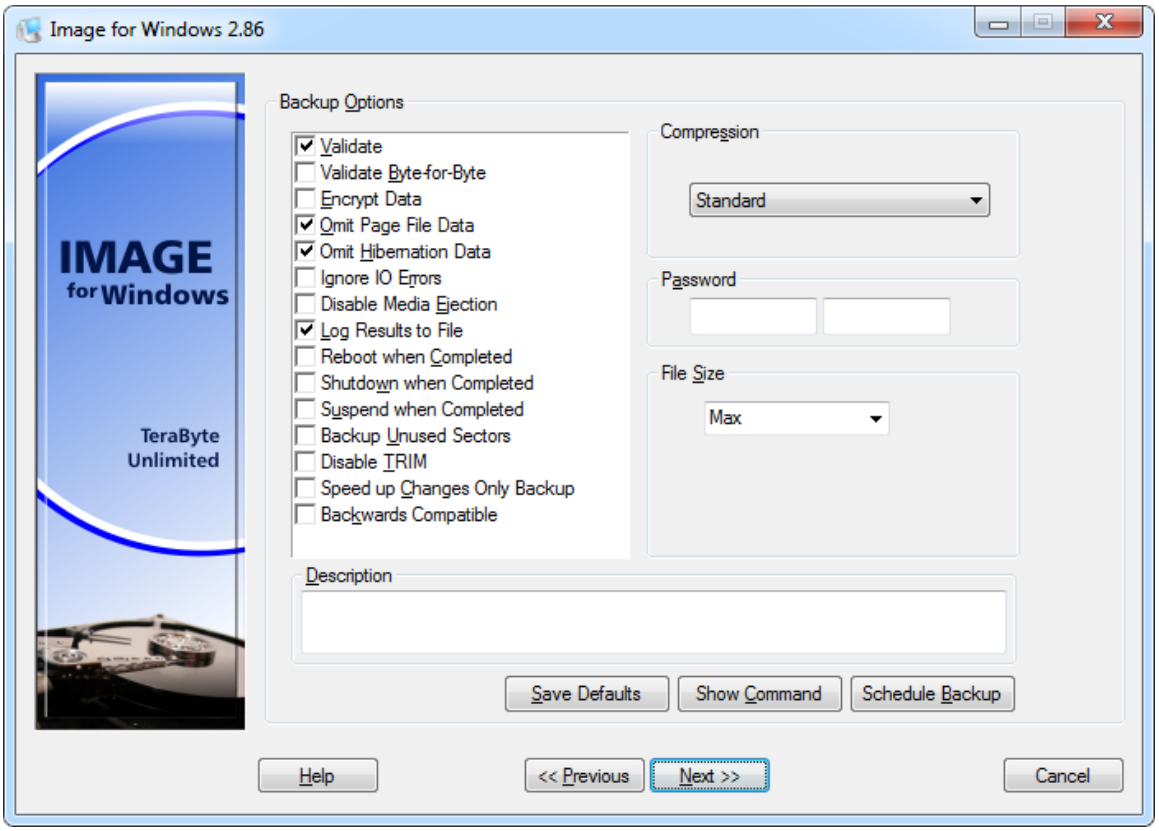
Use the **Password** tab to manage your stored passwords. Stored passwords are saved encrypted in the registry and can be used with the email or login password so clear-text passwords are not needed. Enclose the name between **{#** and **#}** when using them (e.g. **{#StoredName#}**). It's important to note that they are only valid when running under the same user account that created them. Additionally, a password stored using the 64-bit version of Image for Windows may not be available to the 32-bit version or vice versa (see the command line option **/altregview** for details).

To run the application as a particular user, hold down the shift key while right-clicking the program icon and choose *Run as different user…* (or similar, depending on your version of Windows).

To add a password enter the name and password (twice for verification) into the fields and then click **Add**. To delete a password, select it in the list and press the **Del** key on the keyboard.

Setting Backup Options

You can set the same options when backing up in Image for Windows whether you are backing up a partition or an entire drive. The options shown below are for a Full backup.



Validate – If you select this option, Image for Windows will perform internal consistency checks on the backup file(s) after creating them. Enabling this option increases the overall processing time, but can help ensure that the backup is reliable.

Validate Byte-for-Byte – If you select this option, Image for Windows will verify that every byte in the source data was backed up correctly, ensuring 100% accuracy. This option generally doubles the processing time of the overall backup operation, but is advisable to use where maximum reliability is required. You can (but do not need to) select the **Validate** option if you select the **Validate Byte-for-Byte** option.

Encrypt Data – If you select this option, Image for Windows will encrypt the backup file(s) with 256-bit AES encryption prior to saving them to the target medium. If you select the **Encrypt Data** option, you must also supply a password in the **Password** text boxes. Enter the password in the first **Password** text box and retype it in the second **Password** text box for verification.

*Note: If you create a backup with the **Encrypt Data** option, you will be required to supply the password whenever you wish to validate the backup, restore it, or open it in TBIView or TBIMount. If you lose and/or forget the password, you won't be able to open or restore from the backup. **TeraByte Unlimited has no way of recovering data from an encrypted backup with an unknown password.***

*If the **Encrypt Data** setting is not enabled, the **Password** text boxes have no effect and may be left blank.*

The maximum password length is 128 characters. Passwords are case sensitive and may contain upper-case letters, lower-case letters, numbers, special characters, spaces, and non-ASCII characters. *Note: You may want to avoid using special language characters in a password if it will be difficult or impossible to enter those characters in Image for Dos or Image for Linux.*

Omit Page File Data – If you select this option, the page files (`pagefile.sys`, `swapfile.sys`) that reside in the root directory of the source partition will not be backed up. If the page files reside anywhere else on the source partition other than the root directory, Image for Windows *will* back them up, regardless of this setting.

Omit Hibernation Data – If you select option and the `hiberfil.sys` file resides in the root directory of the source partition, Image for Windows will not back up `hiberfil.sys`. If `hiberfil.sys` resides anywhere else on the source partition other than the root directory, Image for Windows *will* back it up, regardless of this setting.

Ignore IO Errors – This option only affects how Image for Windows handles bad sectors on the *source* drive, and it applies to both the back up phase and the validation phase of the backup operation. Normally, if Image for Windows encounters a bad sector on a source partition during a backup operation, it will abort with an error. If you select this option, Image for Windows will ignore the error and continue. Generally, you should select this option only if you need to back up a source partition on a drive you know contains bad sectors. On some systems, if you select this setting and Image for Windows encounters bad sectors, there will be a significant delay as the internal retry/recovery routine of the drive attempts to handle the bad sector(s).

Disable Media Ejection – When removable media is used, this option prevents Image for Windows from automatically ejecting the removable media. If you don't select this option, Image for Windows will eject the media whenever new media is needed, and at the completion of the backup operation.

Log Results to File – Select this option to make Image for Windows log the details of the operations it performs. Image for Windows saves the log as `IFW.LOG` in the `IMAGEW.EXE` program folder. To be able to save IFW.LOG, Image for Windows must have permissions to write to the target folder (this is usually not a problem in Windows).

Reboot when Completed – Select this option to have Image for Windows request that the computer reboot after completing the backup operation.*

Shutdown when Completed – Select this option to have Image for Windows request that the computer shut down after completing the backup operation.*

Suspend when Completed – Select this option to have Image for Windows request that the computer suspend (sleep) after completing the backup operation.*

Hibernate when Completed – Select this option to have Image for Windows request that the computer hibernate after completing the backup operation.*

*If multiple power options are selected, precedence is as follows: suspend, hibernate, shutdown, reboot.

Backup Unused Sectors – By default, if the file system(s) you are backing up are one of the recognized types (i.e. FAT, FAT32, NTFS, Ext2/3/4, ReiserFS, or HSF+), Image for Windows will back up only used sectors. If you select this option, Image for Windows will include all used and unused sectors in the backup. This option has no effect on partitions that do not contain a recognized file system; such partitions will always be backed up in full, regardless of this setting.

NOTE: This option will cause Validate Byte-for-Byte to fail if VSS or PHYLock is used. This option also causes Image for Windows to ignore the Omit Page File Data and Omit Hibernation Data options.

For entire drive backups this option causes a raw sector by sector backup (and later restore) of the entire drive without regard to any partitions or adjustments.

This option is not available when creating a differential or incremental backup. Instead, the new backup will use the setting as specified when the base image was created.

Disable TRIM – Reduces the amount of caching required for the source drive on systems with TRIM enabled by disabling TRIM during the backup operation. When TRIM is enabled the original contents of deleted sectors must be cached, whereas a normal delete doesn't overwrite the sectors and instead just updates the directory entry. **Note:** If the operation doesn't complete (due to reboot, shutdown, process forced to end, etc.) TRIM will stay disabled until enabled using the Windows fsutil program (`fsutil behavior set DisableDeleteNotify 0`). If IFW completes the operation, even with errors reported, TRIM will be properly reset to the enabled state.

Speed up Changes Only Backup – Select this option to have Image for Windows create a hash file to speed up creating a Changes Only (differential or incremental) backup. This option is only available when creating an image that is not being saved to disc media (CD/DVD/BD). By default, this option is also ignored if the Backwards Compatible option is enabled. The hash file will be limited to the max file size and have the same file name as the backup with an extension starting at .#0 followed by .#1, .#2, etc. as needed. The actual speed increase realized when creating an image will vary depending on the system. If the hash file is deleted the

back up will proceed as normal without it. To create a hash for an existing image use the `/hash` operation command line parameter.

Backwards Compatible – Current versions of Image for Windows may use a TBI format that is not compatible with prior versions. Select this option to have Image for Windows create the TBI file using a format that is compatible with version 2.50. If desired, use the **BackwardsCompatibleLevel** INI file option to specify a more current file version. Note that this option will not be available if the backup requires a newer version to support it.

Multi-Pass – This option appears when you make a differential or incremental backup (Backup, Change Only) and tells Image for Windows to use a two step process to make the differential backup. In the first step, Image for Windows looks for what it needs to back up and then, in the second step, Image for Windows makes the actual backup. In some situations, using the Multi-Pass option can make the operation go faster.

Compression – Select **Standard** or one of the **Enhanced** options to compress the backup files that Image for Windows creates. With compression, Image for Windows typically produces smaller image files but takes longer to back up. If you select **None**, Image for Windows creates your backup more quickly but produces larger image file(s). The attainable compression ratio depends on a number of factors, including the number, size, and content of the files on the source partition and the level of file fragmentation on the source partition. Typically, Image for Windows compresses backup files 40% - 60%. However, if the source partition primarily contains files that do not compress well, such as media files like MP3, JPG, and AVI, or archive files like 7Z, RAR, and ZIP, the compression ratio will be much lower.

The **Enhanced Size - A/B/C** options correspond to the **Enhanced - Normal/ Slower/Slowest** options used by version 2.71 and earlier. These options provide greater compression, but the backups may take considerably longer. The **Enhanced Size - D/E/F** options are faster than their A/B/C counterparts, but offer slightly less compression. The **Enhanced Speed - A/B** options offer decent compression with the emphasis on back up speed over backup file size. *Note: The **Enhanced Size - D/E/F** and **Enhanced Speed - A/B** options require version 2.72 or later (they are not backwards compatible).*

File Size – This option appears only when saving images to hard drives. Select this option to choose the maximum size of the image files created by Image for Windows. The available options are:

* Max – Automatically creates the largest file(s) allowed by the file system in use on the target medium. For example, the largest files that may reside on FAT, FAT32, and NTFS partitions are 2 GiB, 4 GiB, and (just under) 16 TiB, respectively.

* 7.95 GiB – Useful if the image file(s) will later be burned to standard dual-layer DVD disc(s).

* 4.37 GiB – Useful if the image file(s) will later be burned to standard single-layer DVD disc(s).

* 4 GiB – Useful for FAT32 compatibility.

* 2 GiB – Useful for FAT compatibility.

* 698 MiB – Useful if the image file(s) will later be burned to 700-MiB CD disc(s).

* 648 MiB – Useful if the image file(s) will later be burned to 650-MiB CD disc(s).

* You can also type in the desired value in bytes, Kibibytes (KiB), Mebibytes (MiB), or Gibibytes (GiB). Decimal values are supported (e.g. 2.5GiB).

Description – You can use this text box to assign descriptive text to individual backups. The description you enter will be visible in the file list that appears when you are preparing to restore or validate a backup. You view the description by selecting the backup and clicking the **File Description** button in Image for Windows or pressing **F1** in Image for DOS/Linux.

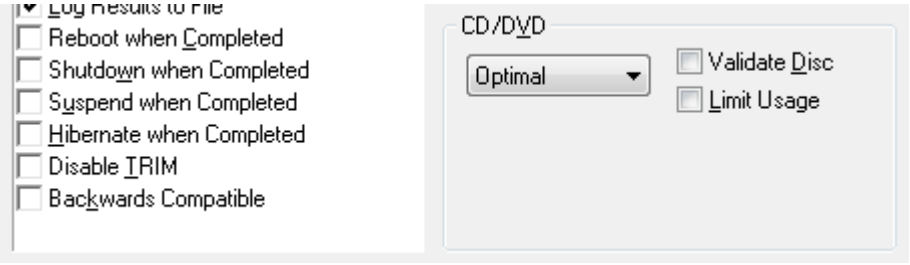
Save Defaults – Click this button to save the settings you establish. In the future, Image for Windows will display these settings automatically.

Show Command – Click this button to display the information you would type at a command prompt to start a backup with the options you selected as you displayed the various windows in Image for Windows. You can use this information to create a batch file or TBScript (.TBS) file that runs Image for Windows by selecting the **Save to File** option. The command line can be edited before being saved. For details on using Image for Windows from a command prompt, see the section, “Running Image for Windows from the Command Line” on Page 124.

Schedule Backup – Click this button to create a task in the Windows Task Scheduler, with a command line that corresponds to the current backup operation. Please refer to Appendix D: Scheduling Backups for more information.

Additional Backup Options for Removable Media

When saving images to removable media such as CD/DVD/BD discs, the following additional options appear:



Validate Disc – If you check this option, Image for Windows will validate each disc after writing the disc to ensure that the disc is readable. If the disc is not readable,

you can have Image for Windows write the individual disc again without restarting the entire backup.

Limit Usage – Use this option to instruct Image for Windows to leave the last 10% of each disc unused to help prevent data errors that occur near the edges of discs.

Drop Down List to Set Maximum CD/DVD Burning Speed: Use this list to specify the *maximum* disc writing speed that Image for Windows should use when burning a CD or DVD disc. You can force a lower writing speed than that automatically used by the optical drive's firmware; slower writing speeds may increase reliability.

The maximum writing speed that Image for Windows actually uses is determined by whichever is *lower*: the setting you select here or the speed deemed appropriate by the drive's firmware, according to the CD/DVD/BD media in use. For example, if you are using media that is rated at 8X for burning, the maximum writing speed will be no more than 8X, regardless of the setting you choose here. Similarly, if you supply a value that is higher than or invalid for the drive's design limits, the drive will automatically use the highest speed supported by both the drive and the media in use.

DVD speeds are approximately 1/8 CD speeds, therefore a maximum burning speed of 32X for a CD disc corresponds to 4X for a DVD disc, 16X for a CD corresponds to 2X for a DVD, and so on.

Creating a Differential or Incremental Backup

When you create a differential backup, Image for Windows compares the condition of the source partition or hard drive to a full backup you identify to determine what changes have occurred on the source partition or hard drive since you created the full backup.

When you create an incremental backup, Image for Windows compares the condition of the source partition or hard drive to the incremental backup (or full backup, if no incrementals) you identify to determine what changes have occurred on the source partition or hard drive since you created the specified incremental backup.

Note: When creating incremental backups remember to limit the chain length to a reasonable number. Each backup in the chain requires additional memory to process and adds another potential point of failure.

Both differential and incremental backups contain only the changed sectors. For details on differential and incremental backups, see Appendix B: Backup Strategies on Page 199.

The process for creating a differential or incremental backup is very similar to the process for creating a full backup, and you set many of the same options during both processes. When you analyze the steps you take, you'll notice the following differences:

* When you create a full backup, you identify the source drive you want to back up.

* When you create a differential backup, you identify the full backup Image for Windows should reference when creating the differential backup.

* When you create an incremental backup, you identify the incremental backup (or full backup, if no incrementals) Image for Windows should reference when creating the new incremental backup.

Tip: It's always a good idea to validate your backup as you create it.

1. Double-click the Image for Windows icon on your desktop or launch the program from its program group on the Start menu.

2. In the window that appears, select **Backup (Changes Only)**.

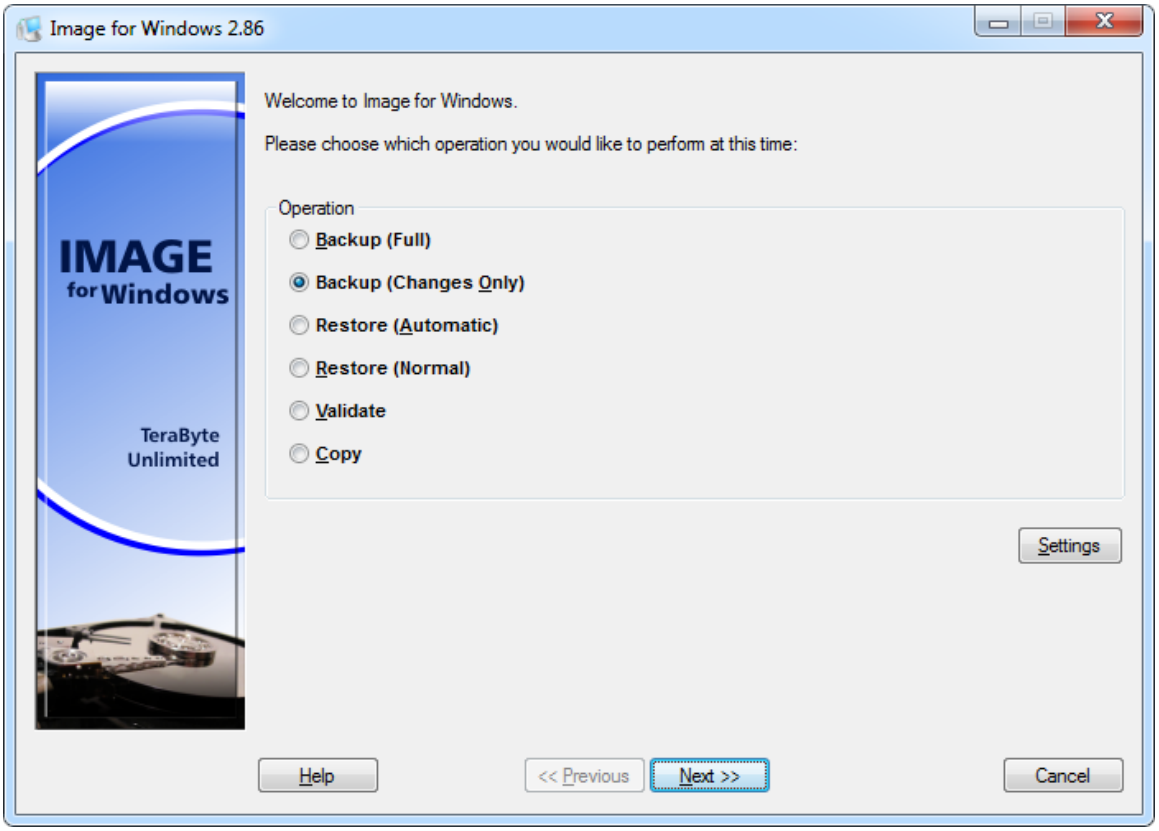
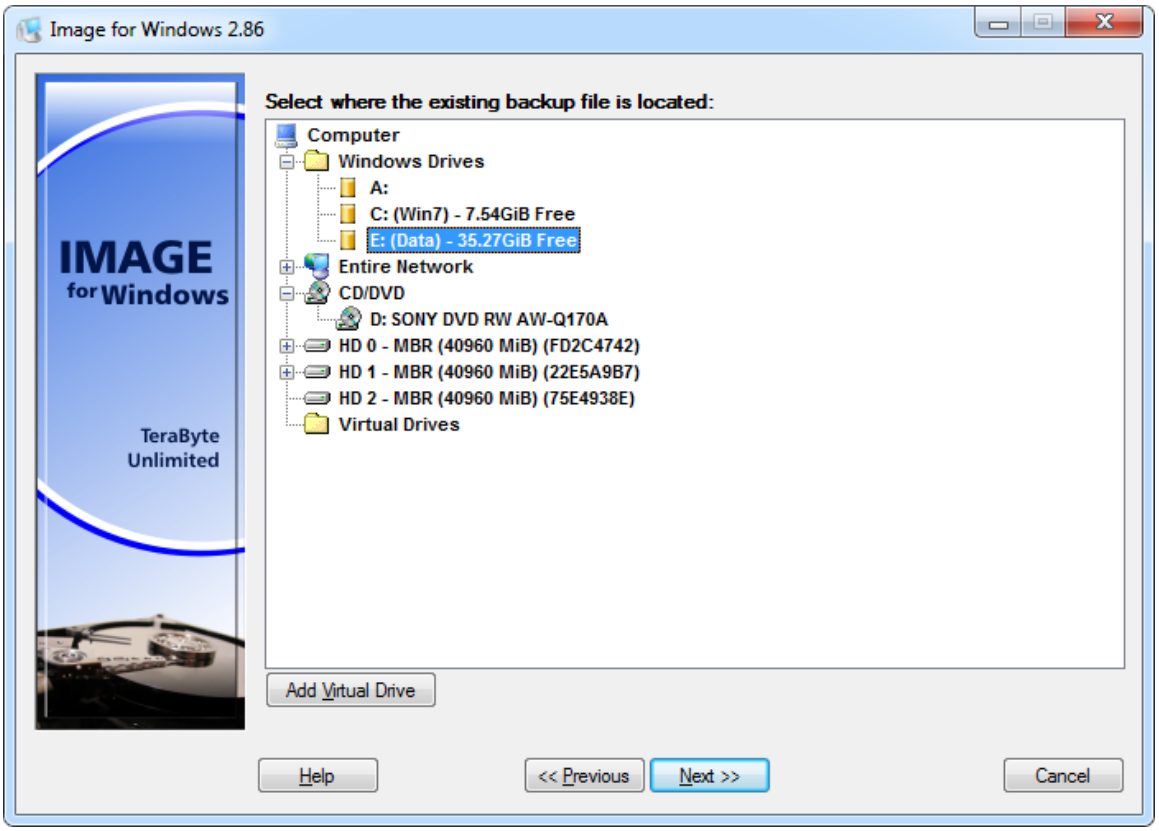


Image for Windows 2.86
IMAGE
for Windows
TeraByte
Unlimited
Welcome to Image for Windows.
Please choose which operation you would like to perform at this time:
Operation
Backup (Full)
Backup (Changes Only)
Restore (Automatic)
Restore (Normal)
Validate
Copy
Settings
Help
<< Previous
Next >>
Cancel

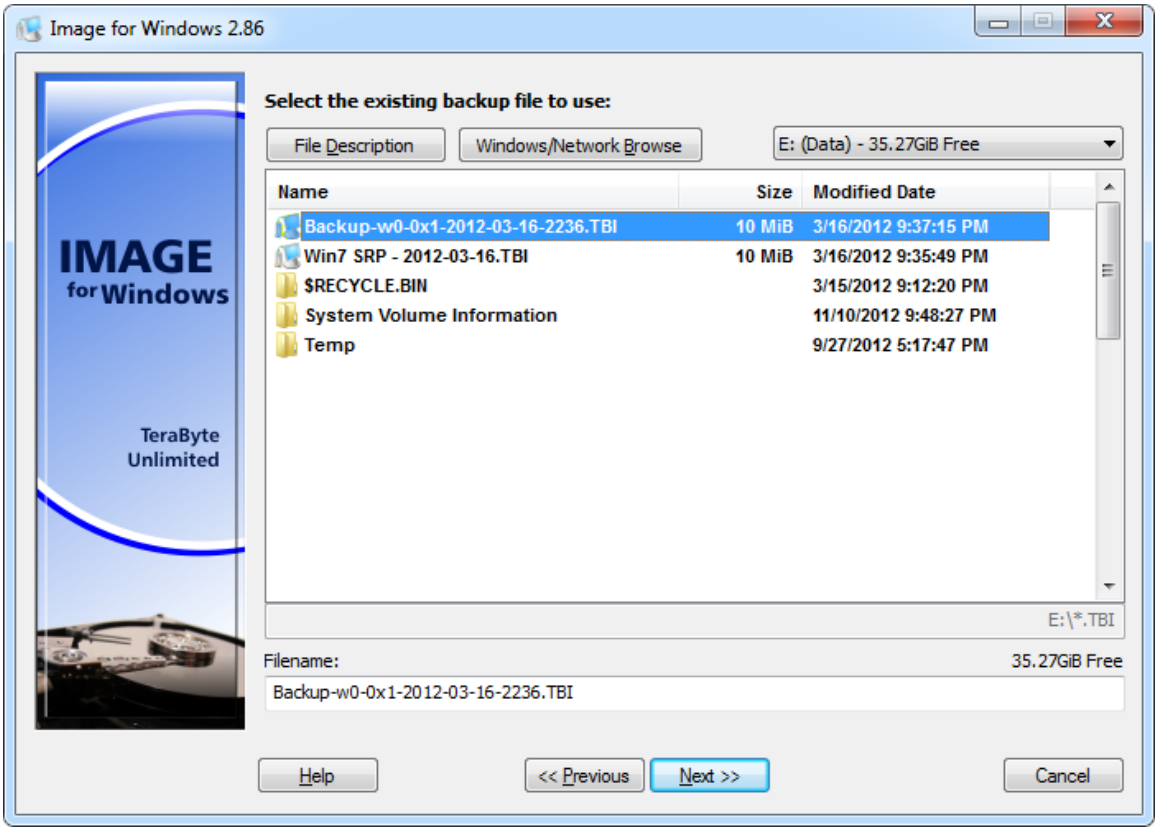
3. Click **Next**. In the window that appears, select the location where you stored the existing full or incremental backup file. If you stored the backup image on a device that Image for Windows doesn't display, just highlight any Windows drive and continue to the next step.



4. Click **Next**. Image for Windows displays a window where you can select the name of the existing backup.

   If the existing backup you want to select doesn't appear, open the list of drives at the top right corner of the window and select the drive containing the backup file. If you stored the backup on a network drive or a drive Image for Windows does not display, you can click the **Windows/Network Browse** button to navigate to the drive. After selecting a drive, select the backup file so that its name appears in the Filename box at the bottom of the window.

   If you select a file that you created using the encryption or the password-protect option, you will need supply the correct password to continue. Additionally, Image for Windows will prompt for the locations of any backups in the selected chain if it's unable to locate them in the folder of the existing backup.



5. Click **Next**. In the window that appears, select the location to save the differential backup file. You can select a CD/DVD/BD drive, an external hard drive, a virtual drive, or a partition other than the one you are backing up. If you want to store the differential backup on a device that Image for Windows doesn't display, just highlight any Windows drive and continue to the next step.

Note: You do not need to store files from a differential or incremental backup in the same location where you store full backup files. When you restore a differential or

incremental backup, Image for Windows will prompt you for the locations of the full, differential, and incremental backup files.

6. Click **Next** and Image for Windows displays a window that closely resembles the window shown in Step 4.

   You can open the list of drives at the top of the window and select the drive where you want to store the differential/incremental backup file. If you want to store the file on a network drive, you can type in the UNC or click the **Windows/Network Browse** button to navigate to the share. If you want to store the backup on a drive Image for Windows does not display, you can click the **Windows/Network Browse** button to navigate to the drive.

Note: Windows Vista & Windows 7 users must select the Desktop item or show the folders window on the left pane for the network option to appear.

   Type a name for the differential/incremental backup file or accept the default name Image for Windows suggests that includes identifying information. The suggested name includes the following information in the order it appears: “w” (for Windows), a number representing the drive being backed up, the letters “chg” which represent the word “changes,” and “$~YYYY$-$~MM$-$~DD$-$~HHMM$” representing the date (in 4-digit year, 2-digit month, and 2-digit day format) and time (in 2-digit hour and minute format) the backup starts. If you selected a backup of a partition instead of an entire drive, the partition ID follows the drive number.

7. On the **Backup Options** screen that appears, select the options you want to use. See the section, “Setting Backup Options” on Page 48 for an explanation of each option.

8. If you are backing up to CD/DVD/BD discs, insert a blank disc.

9. On the **Summary** screen that appears, select **Start** when you are ready to begin the backup process. A progress bar appears on-screen. You can interrupt the backup and validation operations at any time by clicking **Cancel** or pressing the Esc key. Image for Windows will ask you to confirm that you want to cancel before it interrupts the current operation.

   While the backup is in process, you can change the power options and process priority options using the drop-down boxes. The default power option is Auto, which will prompt to reboot when finished if a reboot is necessary. If the selected power option is not supported by the system, the next one will be used in the following order: suspend, hibernate, shutdown. Select Exit Only to have Image for Windows exit when finished. The selected process priority will remain in effect until the program ends or is changed manually.

When Image for Windows finishes, a window appears to inform you that Image for Windows created the backup successfully. You can click **Close**.

Restoring an Image File

You can't restore an image to a partition or drive that is in use by your computer. That is, you cannot boot to a copy of Windows and then restore an image over that copy of Windows.

Boot Media and UEFI Systems

Computer systems that come from the manufacturer with Windows 8 installed include a new BIOS interface known as the Unified Extensible Firmware Interface (UEFI). This new BIOS interface boots media differently than a traditional BIOS. Microsoft also requires these systems to use a feature of UEFI called Secure Boot. When Secure Boot is enabled, the system will only boot items that have a digital signature that is included in the system firmware. The manufacturers include a digital certificate, provided by Microsoft, to boot Windows on their systems. Secure boot can be disabled (on non-ARM systems) to allow you to boot other operating systems and environments. Boot media must be specifically created for UEFI to allow UEFI to boot from it. However, most systems also include the ability to boot traditional boot media though a method or mode typically called Legacy or BIOS.

Using TeraByte Boot Media on UEFI Systems

When creating the boot media for a UEFI system it's important to understand which media will boot properly on the UEFI system. System settings may require changing to boot Image for Linux or Image for DOS depending on the implementation of UEFI on the system.

- TBWinRE (the Image for Windows boot media) supports booting via CD or USB flash drive on UEFI systems. Secure Boot is supported and the BIOS can be in either UEFI mode or Legacy mode. TBWinRE is automatically installed with Image for Windows on Windows 7, 8, or later. You must run TBWinRE to create your boot media.

- Image for Linux (IFL) v2.79 or later supports booting via CD or USB flash drive on UEFI systems. Secure Boot is not currently supported and must be disabled in the BIOS. Attempting to boot with Secure Boot enabled will result in the boot being blocked.

- Image for DOS (IFD) will not boot on UEFI systems configured in UEFI mode. To boot on these systems Secure Boot must be disabled and you must enable or use Legacy mode.

You can deal with this situation in several ways:

* You can use Image for DOS or Image for Linux to restore an image to a Windows partition.

Note: When you purchase Image for Windows, you automatically receive copies of Image for DOS and Image for Linux.

* You can use TBWinPE or TBWinRE. TBWinPE is based on the Windows AIK/ADK (requires download from Microsoft). Windows 7 and Windows 8 users can easily create TBWinRE boot media (does not require downloading the Windows AIK/ADK) and add Image for Windows to the Windows Recovery Environment. The TBWinRE files are automatically installed in the *tbwinre* sub-folder of the Image for Windows installation folder and can be accessed there or from the *Create Recovery Boot Disk* shortcut in the Start menu. Tutorials for creating TBWinPE and TBWinRE boot media can be found on TeraByte's website.

* You can use the free Bart PE and the "PE Builder Plugin Installer" included with Image for Windows to build a bootable Windows CD or DVD that also contains Image for Windows. When you boot your computer using this CD/DVD, you boot to a Windows pre-installation environment state, where you can use Image for Windows to restore your backup. A tutorial for creating a BartPE CD can be found on TeraByte's website.

In the sections that follow, you find information on creating the Image for DOS boot media and using it to restore a backup. Using Image for Linux is very similar, so, if you prefer Linux, you can create the Image for Linux boot media and use it to restore. For more information on either product, see their respective manuals.

The information about using Image for Windows to restore an image follows the information about using Image for DOS. So, read the section appropriate to your situation.

Before you dive into restoring an image, consider the size of the target location where you plan restore the image. The target must be large enough to accommodate the data from the source partition. The *minimum* amount of space Image needs to restore an image in the target location equals the amount of space encompassed from the beginning of the source partition to the last used area of the source partition. For example, suppose that the source partition had 2 GB of data and the last part of that data ended 15 GB from the beginning of the source partition. In this case, the target area needs to be at least 15 GB in size, regardless of the overall size of the source partition.

If the target is larger than the source partition, there will be an area of free space left over unless you use the "Resize Partition" or "Resize After Restore" option or perform the restore via command line using the /X parameter as explained later in this manual.

Also, please remember the following.

* If your computer contains more than one CD/DVD/BD drive and you are restoring using Image for DOS from a CD/DVD/BD disc, please make sure that you insert your Image for DOS bootable disc in one drive and no other optical drive contains a bootable disc.

* Since the hard drive order during the boot process may be different than it is while Windows is running, you may need to press a key when prompted to access the Image for DOS menu that will allow you to select the appropriate drive from which to restore.

Restoring a Backup with Image for DOS

You run Image for DOS by creating bootable media (CD/DVD disc, USB flash drive, floppy diskette) that contains the Image for DOS program. Then, you simply use the Image for DOS boot media to boot the computer containing the drive that you want to back up or restore. Once the computer boots, Image for DOS automatically starts.

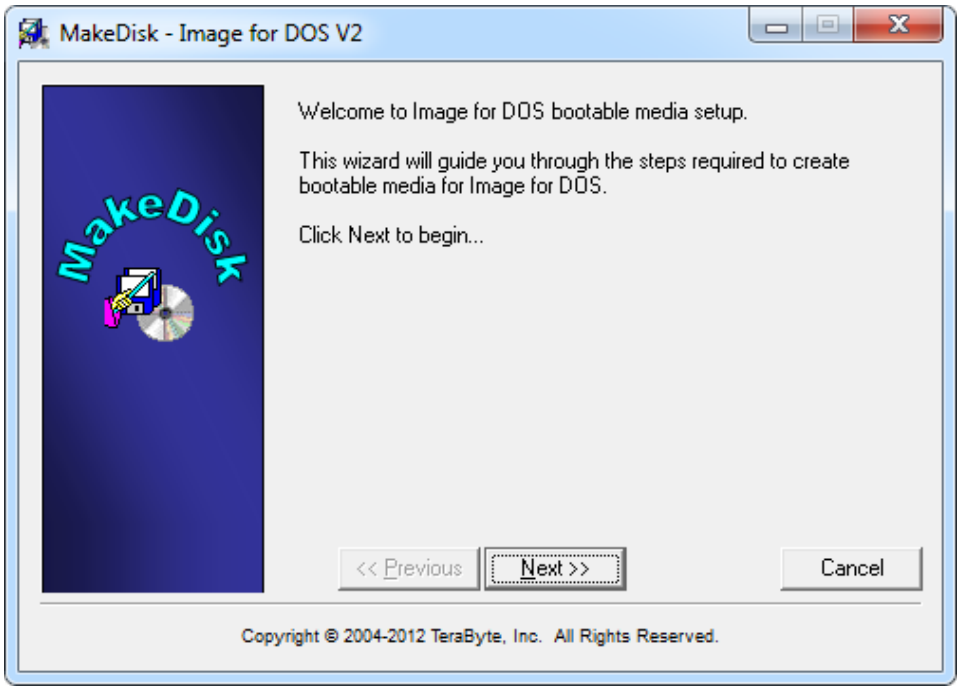
Creating a Bootable Image for DOS Disc

In Windows, you can create the Image for DOS boot media using the MakeDisk utility. MakeDisk is included when you download Image for DOS or Image for Windows.

Follow these steps to use the MakeDisk utility to create the Image for DOS boot media:

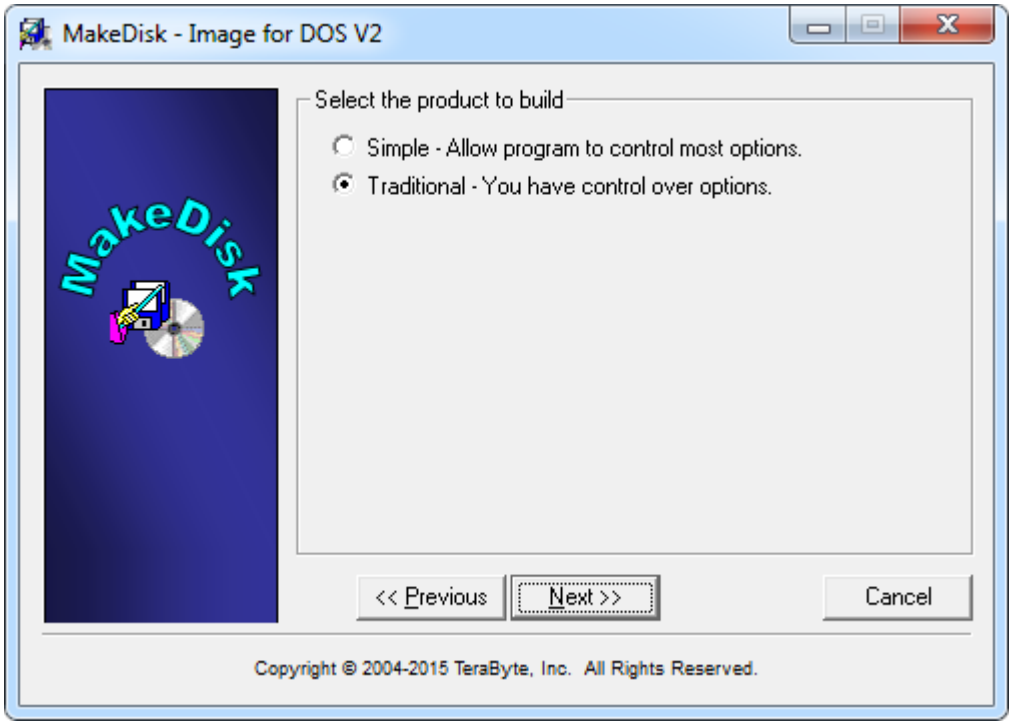
Note: These steps assume that you installed the optional "Image for DOS Recovery Disk" component during Image for Windows setup; if you did not, re-run the Image for Windows setup and select the component on the Additional Components window. If you also select the Create Image for DOS Recovery Disk option on the Select Additional Tasks window, skip Step 1 below.

1. Choose Start, All Programs, Terabyte Unlimited, Image for Windows, V2, Image for DOS, Create Recovery Boot Disk. (This will trigger a UAC prompt in Windows Vista and Windows 7 if UAC is enabled. Select to allow the program to run.) The MakeDisk welcome screen appears.

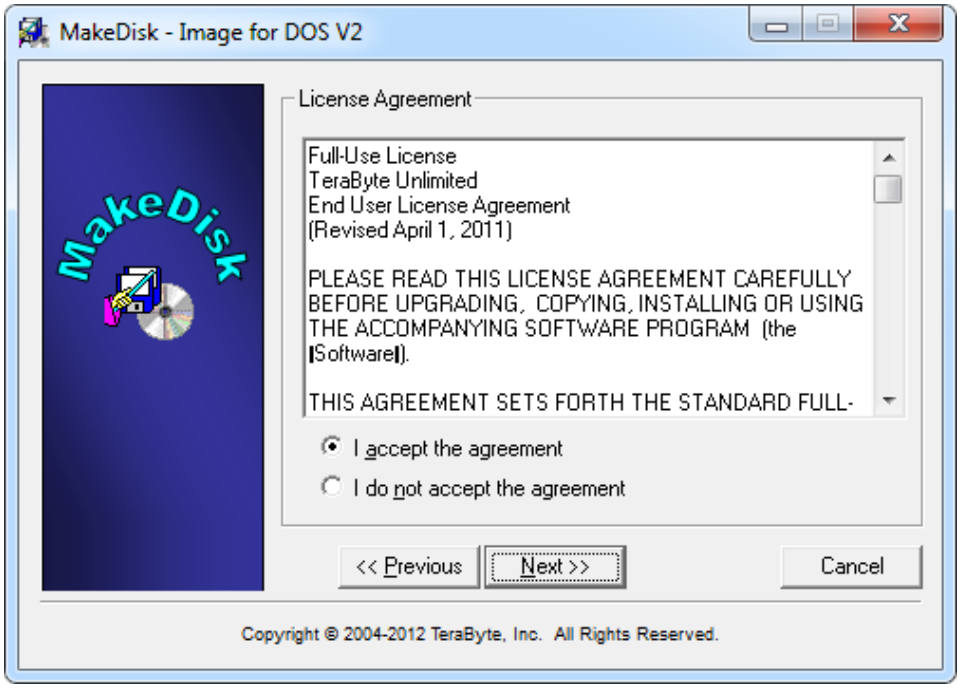

MakeDisk - Image for DOS V2
MakeDisk
Welcome to Image for DOS bootable media setup.
This wizard will guide you through the steps required to create bootable media for Image for DOS.
Click Next to begin...
<< Previous
Next >>
Cancel
Copyright © 2004-2012 TeraByte, Inc. All Rights Reserved.

2. Click Next on the MakeDisk welcome screen. The “Select the product to build” screen appears. Image for DOS can operate in simple or traditional mode. Select the operating mode you wish to use (the mode can be changed at any time in program settings) and click Next.

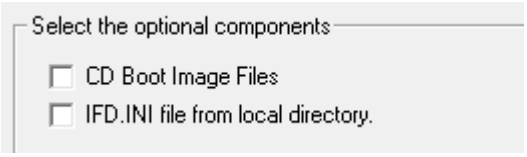
   Selecting “Simple” will enable Simple Operations mode. This allows Image for DOS to automatically handle most options for you. Backup, Restore, Validate, and Copy operations are available in this mode. Refer to Using Simple Operations Mode on page 114 for details.


MakeDisk - Image for DOS V2
MakeDisk
Select the product to build
Simple - Allow program to control most options.
Traditional - You have control over options.
<< Previous
Next >>
Cancel
Copyright © 2004-2015 TeraByte, Inc. All Rights Reserved.

3. The “License Agreement” screen appears. Read the Image for DOS license agreement, and if you accept it, select the “I accept the agreement” button and click Next.


MakeDisk - Image for DOS V2
MakeDisk
License Agreement
Full-Use License
TeraByte Unlimited
End User License Agreement
(Revised April 1, 2011)
PLEASE READ THIS LICENSE AGREEMENT CAREFULLY BEFORE UPGRADING, COPYING, INSTALLING OR USING THE ACCOMPANYING SOFTWARE PROGRAM (the |Software|).
THIS AGREEMENT SETS FORTH THE STANDARD FULL-
I accept the agreement
I do not accept the agreement
<< Previous
Next >>
Cancel
Copyright © 2004-2012 TeraByte, Inc. All Rights Reserved.

4. If you are creating the Image for DOS (GUI) boot media or you’ve placed a customized IFD.INI file in the directory with the MakeDisk files, the “Select the optional components” screen will be displayed. Otherwise, the “Device and Checkbox Options” screen will be shown (skip to Step 5).



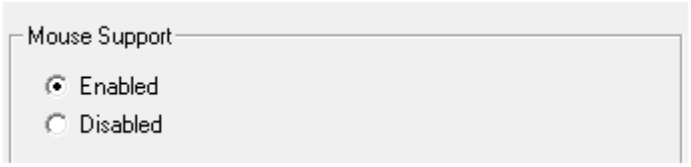
Check boxes to enable the options and then click Next:

* **CD Boot Image Files** – Depending on the boot media type being created (e.g. floppy disk) you may need to exclude the CD Boot Image files to save space. These files are needed to make any direct burned discs bootable (e.g. when you save a backup image directly to a DVD).

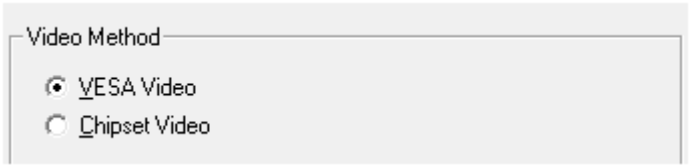
* **IFD.INI file from the local directory** – The IFD.INI file was found in the MakeDisk directory. If you select this option it will be included in the build. This allows you to use an already customized version of the file (you will not be prompted for IFD options/settings).

If using Image for DOS (CUI) skip to Step 5. The following options apply only to Image for DOS (GUI).

The “Mouse Support” screen is displayed. Select to enable or disable mouse support and then click Next. Note that the BIOS must support the mouse. This may require enabling the *USB Legacy Support* in the BIOS.



The “Video Method” screen is displayed. Select the desired video method and then click Next.



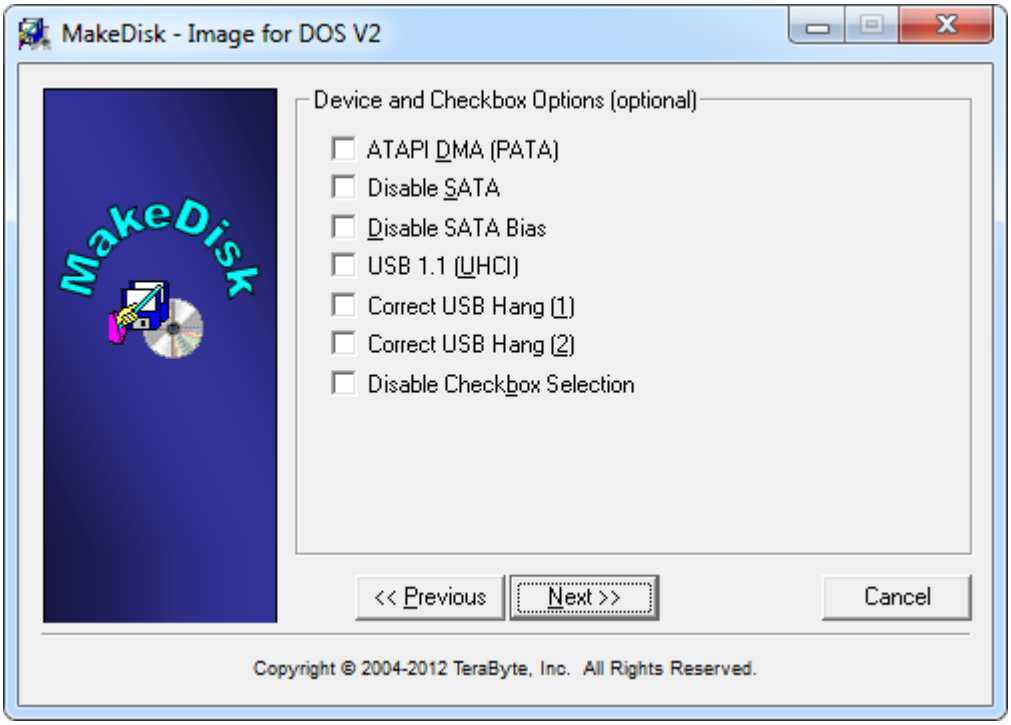
* **VESA Video** – Uses the VESA Video standard for the display instead of a specific chipset implementation. Support is provided by the video card’s BIOS. This is the recommended video method. Will fall back to Chipset Video if VESA is not supported.

* **Chipset Video** – Attempts to access the video chipset directly for supported chipsets. It is not recommended to select this option unless you know for certain it is required (e.g. VESA doesn’t work or you’re instructed to use it by TeraByte support). Will fall back to VESA Video if chipset detected is not supported.

Note: While each video method should fall back to the other one if it fails, this may not always happen. In this case, try the other video method.

The “Video Mode” screen will be displayed. Select the desired video mode and then click Next. For the best viewing experience, it is recommended to select 800x600 or higher with 64K colors.

5. If you selected “Simple” in Step 2 skip to Step 9. Otherwise, the “Device and Checkbox Options” screen is displayed.



Enable the desired options on the “Device and Checkbox Options” screen:

* **ATAPI DMA (PATA)** – If your PATA CD/DVD drive supports ATAPI DMA, enabling this option dramatically speeds up the process of reading from and writing to the CD/DVD drive. This option will not work with some drives; therefore, if you enable this option and have problems using your CD/DVD drive with Image for DOS, recreate the boot media and leave the option disabled.

* **Disable SATA** – Image for DOS includes low level support for SATA when the SATA controller is configured in AHCI mode. If the BIOS doesn’t provide enough information to allow Image for DOS to identify the SATA drives when Image for DOS takes control of the SATA drives, Image for DOS may default to using the BIOS drive; in this case, the system will hang until the BIOS returns control (if ever). If you experience hangs and/or the inability to access a hard drive without an error message, recreate the boot media with the Disable SATA checkbox checked.

* **Disable SATA Bias** – Because some systems have no support whatsoever to match BIOS and SATA drives (see paragraph above), Image for DOS employs a special matching routine to try to identify the BIOS drives that relate to each SATA drive. In some cases, Image for DOS might inadvertently match a BIOS drive to a SATA drive incorrectly. If you experience such an issue, recreate the boot media with the Disable SATA Bias checkbox checked.

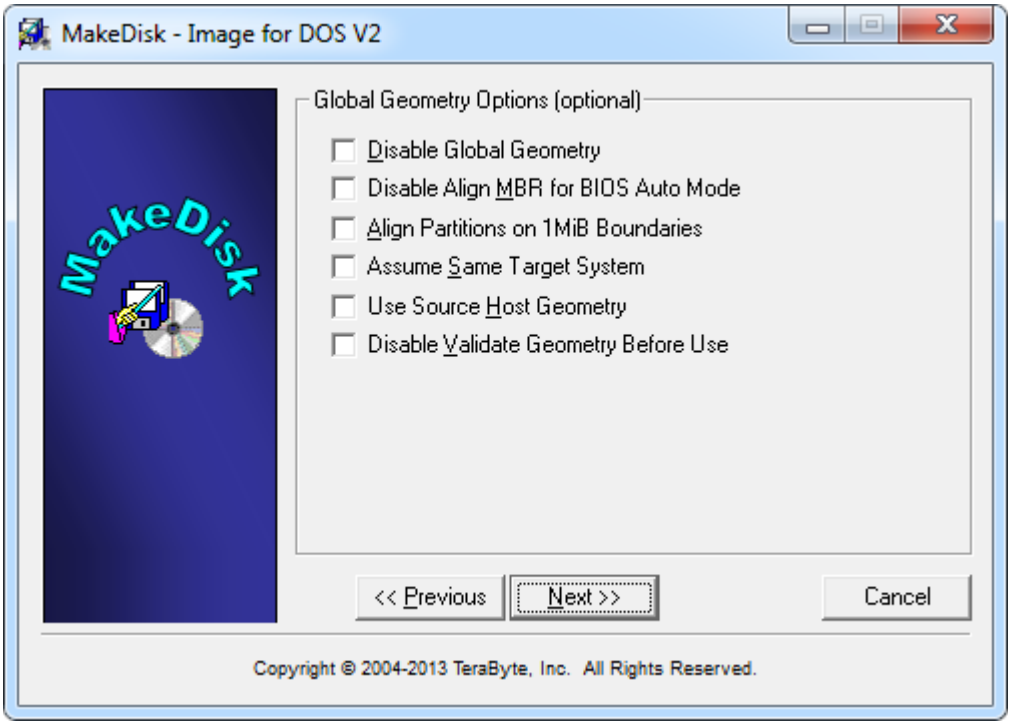
* **USB 1.1 (UHCI)** – If you need USB 1.1 (UHCI) support for older systems that don't support USB 2.0, enable this option. In addition, some new systems require this option or the USB port will hang and Image for DOS won't detect any USB devices. USB 2.0 support is always enabled regardless of this option.

* **Correct USB Hang (1)** – If you experience problems with USB devices hanging, you can enable this option to attempt to correct it. This option can degrade USB IO performance.

* **Correct USB Hang (2)** – If you experience problems with USB devices hanging, you can enable this option to attempt to correct it. This option can degrade USB IO performance.

* **Disable Checkbox Selection** – Disables the use of check boxes to select partitions and makes partition selection function the same as previous versions.

6. Click Next, and the "Global Geometry Options" screen appears.


MakeDisk - Image for DOS V2
MakeDisk
Global Geometry Options (optional)
Disable Global Geometry
Disable Align MBR for BIOS Auto Mode
Align Partitions on 1MiB Boundaries
Assume Same Target System
Use Source Host Geometry
Disable Validate Geometry Before Use
<< Previous
Next >>
Cancel
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Check boxes to enable the options:

* **Disable Global Geometry** - Check this box to disable the global geometry settings and revert to using program defaults or drive specific overrides equivalent to versions prior to 2.52.

* **Disable Align MBR for BIOS Auto Mode** - This option is enabled by default to prevent problems with unaligned partitions on systems with their BIOS using Auto Mode. Many newer systems use auto mode by default,

and some even don't have an option to turn it off. Check the box if you want to disable this option. This is equivalent to enabling the individual overrides *Align MBR Ending HS* and *Align MBR HS when Truncated*. However, you can disable this option by checking the box.

* **Align Partitions on 1MiB Boundaries** – This option provides a convenient way to enable 1MiB partition alignment for all drives (drives with 512 byte sectors will be aligned on 2048 sectors; drives with 4096 byte sectors will be aligned on 256 sectors). This is popular with users of SSD type drives. It is the equivalent to enabling the individual overrides *Align on 1MiB Boundaries, Align MBR Ending HS, Align MBR HS when Truncated*, and disabling *Align on End*.

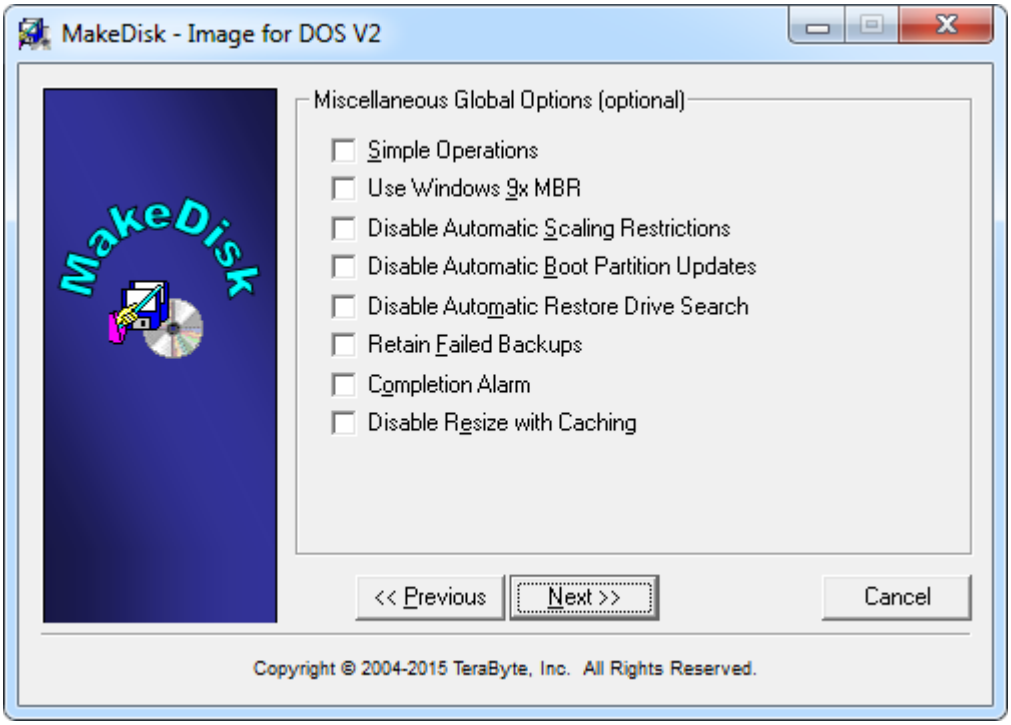
* **Assume Same Target System** – Enable this option to prevent problems where users restore an image from another system to a drive that will be put back in the other system. For example, the hard drive from PC-A is backed up; PC-B is used to restore to a new hard; that new drive is placed back in PC-A. Without this option enabled, Image for Windows would setup the partition to properly boot on the hard drive for PC-B which can sometimes (not always) be a problem when the hard drive is going back to PC-A. This option solves that and is equivalent to the individual *Use MBR Geometry* override.

* **Use Source Host Geometry** - This option is the global equivalent to the individual *Use Original Geometry* override.

* **Disable Validate Geometry Before Use** - This option is enabled by default and used to ensure that the geometry from the MBR on the original system is aligned to known standards before accepting it for use. It only applies when *Assume Same Target System* is enabled. Check this box to disable this option.

Note: The above options are also available in Image for DOS by clicking the Settings button (IFD GUI) or selecting Global Settings (IFD CUI).

7. Click Next, and the “Miscellaneous Global Options” screen appears.



Check boxes to enable the options:

* **Simple Operations** – Enable this option to have Image for DOS automatically handle most options for you. You simply choose which physical drive you want to back up and, if needed, which drive you want to save to – the target storage area is automatically maintained and files are deleted as needed when it runs out of free space. Backup, Restore, Validate, and Copy are available in Simple Operations mode.

* **Use Windows 9x MBR –** Windows Vista and later tied the kernel loader to the MBR code such that using previous MBR code may not allow Windows Vista or later to boot on certain machines. Leave this option unselected (the default) to have Image for DOS use the code base compatible with Windows Vista or later. The new MBR code will continue to boot older OSes with the exception of some (rare) configurations using Win9x on FAT32.

* **Disable Automatic Scaling Restrictions** – Select to have Image for DOS scale small partitions when restoring a full drive image. By default, small partitions will not be scaled and will be restored at their original sizes.

* **Disable Automatic Boot Partition Updates** – Select to prevent Image for DOS from automatically updating the boot partition when restoring a full drive image.

* **Disable Automatic Restore Drive Search** – Select to prevent Image for DOS from searching for the destination drive using the disk signature or

GUID when performing an automatic restore (USB, 1394, and virtual drives will not be searched). If a match isn't found or if this option is enabled, the drive number of the backed up drive will be used.

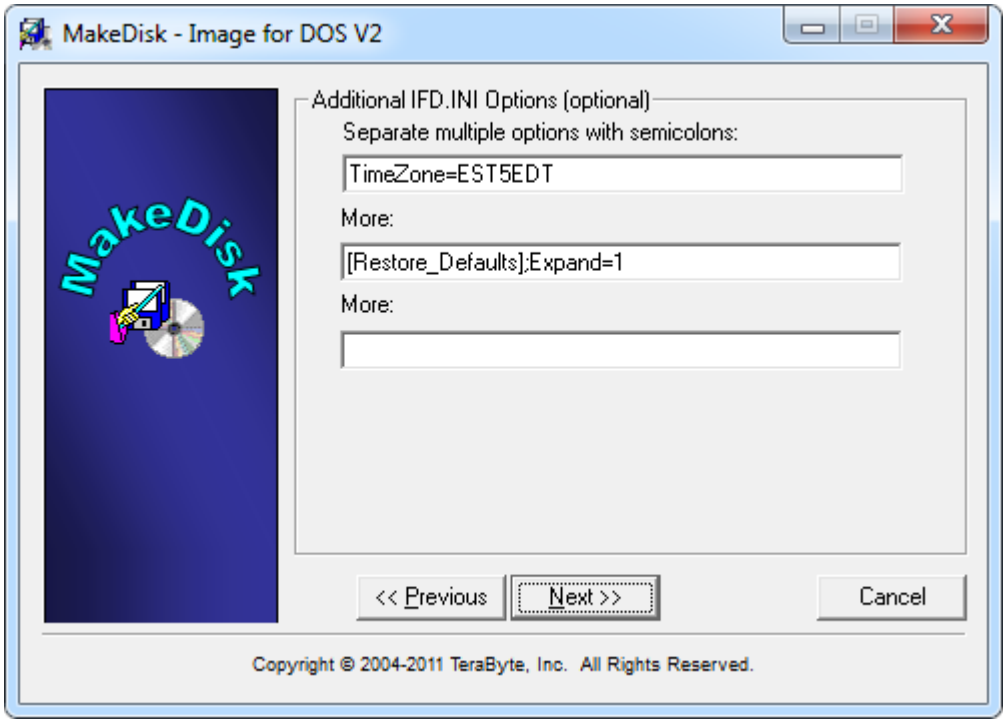
* **Retain Failed Backups** – If you enable this option and a backup operation fails, Image for DOS won't delete the files from the failed backup.

* **Completion Alarm** – Select to enable an audible alarm upon completion of an operation, errors, or when user interaction is required (insert media, etc.).

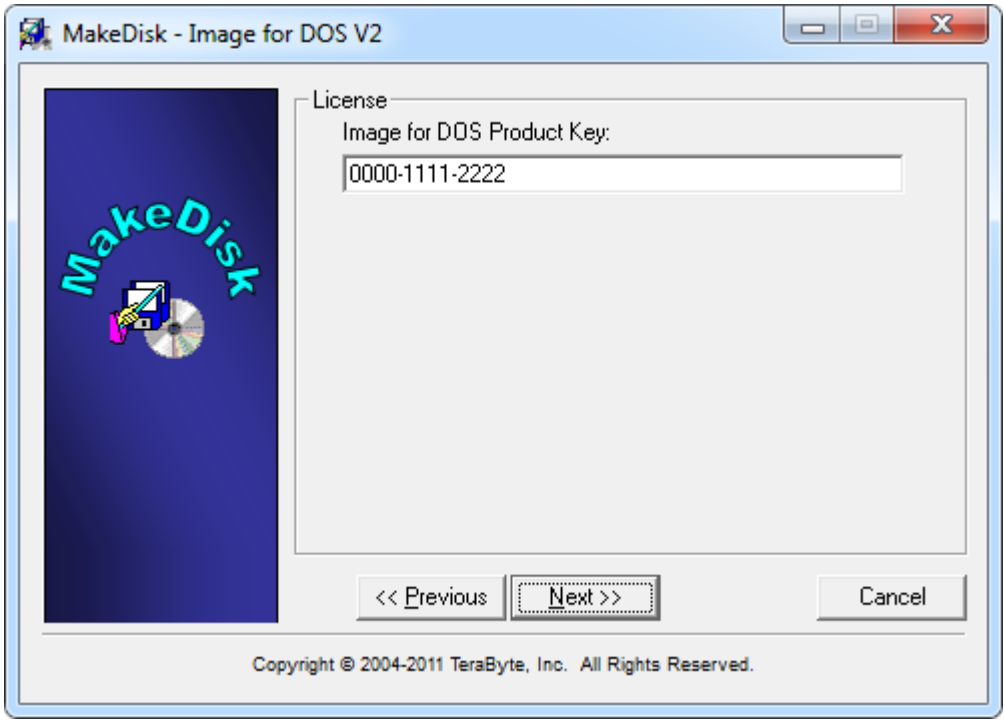
* **Disable Resize with Caching** – Select to prevent Image for DOS from using a cache to reduce the time required to resize a partition. By default, the *Resize with Caching* option is enabled.

Note: The above options are also available in Image for DOS by clicking the Settings button (IFD GUI) or selecting Global Settings (IFD CUI).

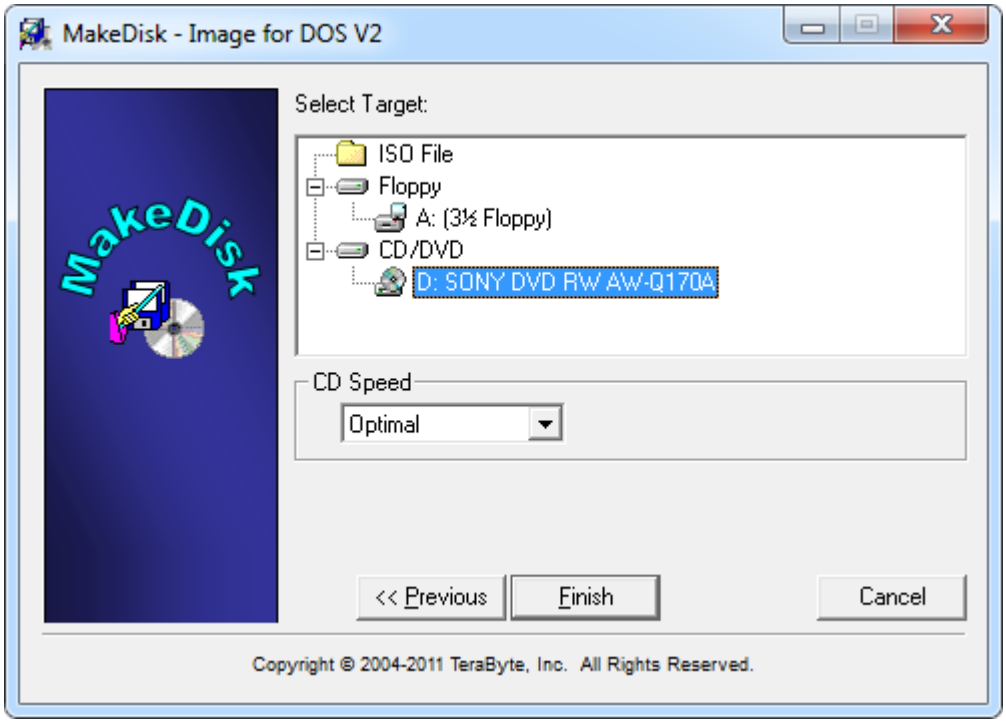
8. Click Next, and the "Additional IFD.INI Options" screen appears. Most of the options you should set to use Image for DOS are set for you by default, but you can use this screen to set additional options. For example, you might want to use the **TimeZone** variable to identify your time zone for Image for DOS. Or you might want the **Scale to Fit** option enabled by default to expand partitions when restoring. Note that for non-global options (those not in the [Options] section) you will need to specify the section (e.g. [Restore_Defaults]). See image below for examples. For a complete list of available environment variables, see the section titled "Image for DOS Environment Variables" in the Image for DOS manual.



9. Click Next, and the “License/Product Key” screen appears. If you own a licensed copy of Image for DOS, supply your product key.



10. Click Next, and the “Select Target” screen appears. Choose the target that MakeDisk should use to create the bootable Image for DOS media.



You can create a bootable USB flash drive with MakeDisk as long as the USB flash drive is not larger than 64 GB.

* If you choose the “ISO File” option, also supply an ISO file name in the box provided.

* If you choose the “3 ½ Floppy” option, be sure to insert a floppy diskette before proceeding. The entire contents of this floppy diskette will be overwritten.

* If you choose the “CD/DVD” option, be sure to insert a *writable* CD or DVD disc before proceeding. The entire contents of this disc will be overwritten.

MakeDisk can automatically overwrite CD-RW and DVD+RW media. However, if you wish to use DVD-RW media, it must be either brand new or fully blanked before being processed by MakeDisk. To fully blank the DVD-RW media, use your burning software’s “full erase” function. (The “quick erase” function will not work for this purpose.)

* If you select a USB flash drive (UFD), you also must select the USB Mode to use: Normal, No Partition, Partition, or Partition Ex—whichever works on your computer; your computer’s BIOS determines which option works.

  Normal - Raw Boot Image – Creates a 1.44 MB floppy diskette image on the UFD. Any additional space on the UFD (beyond the floppy image size) is not available for use. Think of this option as if MakeDisk were formatting the UFD to be a 1.44 MB floppy. If you were to view the UFD in Windows, the drive would appear to be 1.44 MB, even though it might have originally been a 4 GB drive, and formatted as FAT.

  No Partition - FAT/FAT32 Volume – The entire UFD is configured as one big unpartitioned device. If you were to view a 4 GB UFD created using this option in Windows, you’d see free space beyond the amount used by MakeDisk up to the size of the drive. This free space is available to be used normally. If the UFD is 4GB or smaller, it's formatted as FAT. Otherwise, it's formatted as FAT32.

  Partition - MBR FAT/FAT32 Partition – The entire UFD is used as a single bootable partition. The computer's BIOS will usually detect this type of UFD as a hard drive. Any unused space on the UFD is available to be used normally. If the UFD is 4GB or smaller, it's formatted as FAT. Otherwise, it's formatted as FAT32.

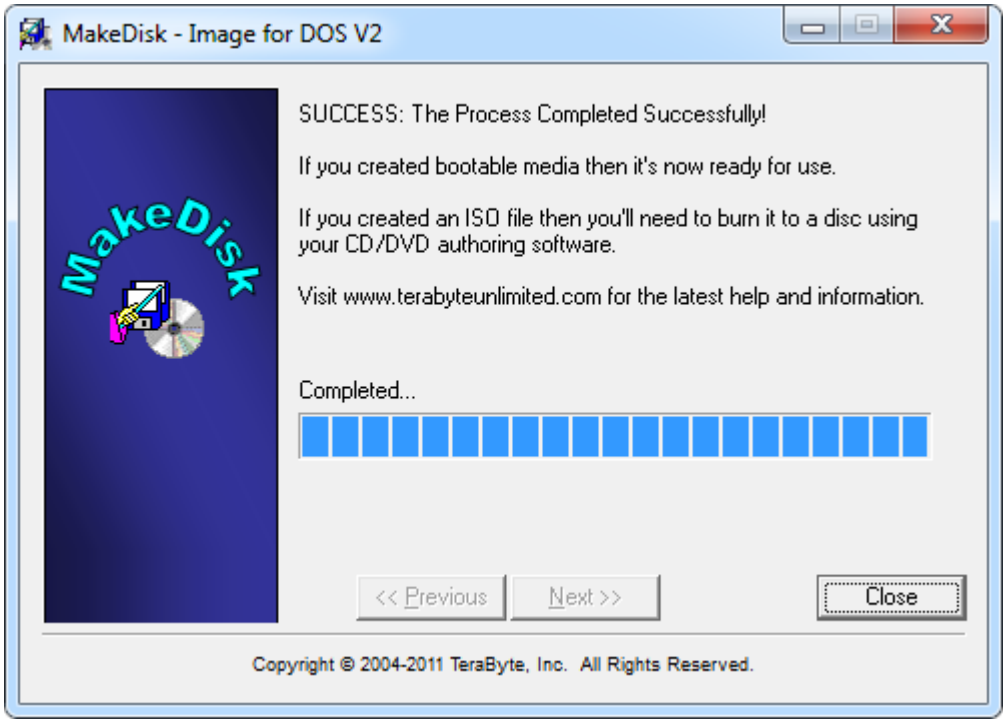
  Partition - MBR FAT/FAT32 Partition (Int13h Extensions) – This is the same as the *Partition - MBR FAT/FAT32 Partition* mode except that the INT 13 Extension is used (this is required for some computers to boot a UFD).

  The **Geometry Calculation Method** options control how the drive geometry is calculated for the USB/SD device. It is recommended to try

the *Default* option first. If the device fails to boot properly (e.g. black screen, boot failure, device not found, etc.), the other options can be tried. Make note of which option works properly for future use.

Note: More information on using UFD boot media can be found in this TeraByte KB article.

11. Click Finish, and respond to subsequent prompts as necessary. MakeDisk will then create the boot media or ISO image. When MakeDisk finishes, the Success screen appears, as shown below.


MakeDisk - Image for DOS V2
MakeDisk
SUCCESS: The Process Completed Successfully!
If you created bootable media then it's now ready for use.
If you created an ISO file then you'll need to burn it to a disc using your CD/DVD authoring software.
Visit www.terabyteunlimited.com for the latest help and information.
Completed...
<< Previous
Next >>
Close
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12. Click Close on the MakeDisk Success screen.

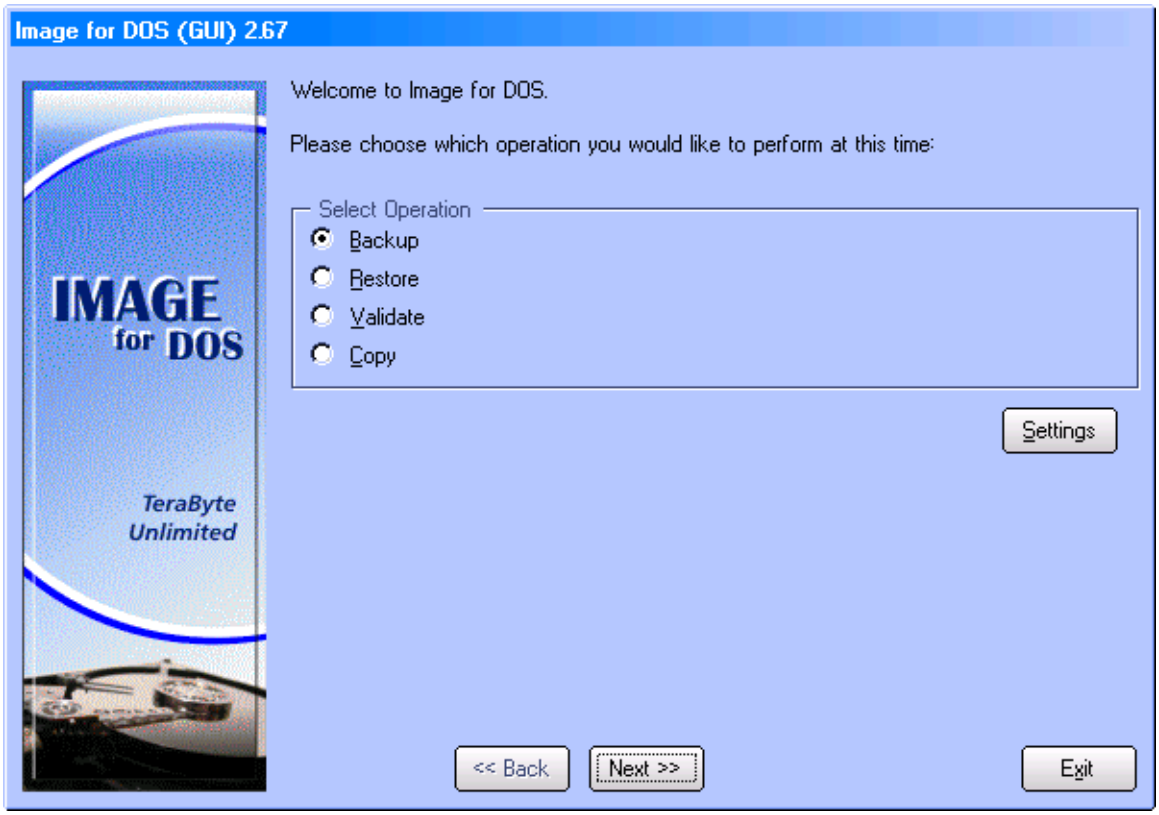
    * If you selected the “3½ Floppy”, “CD/DVD”, or “USB/SD” option in Step 10, you can now use that media to boot and run Image for DOS.

    * If you selected the “ISO File” option in Step 10, you will have to use CD/DVD authoring software to create a bootable disc from the ISO file. (TeraByte’s BurnCDCC utility can be used for this.)

Tip: Be sure to test your boot media to make sure that it works and you can see backup images you made previously.

Navigating the Image for DOS Interface

After you boot your computer with your Image for DOS boot media, the main menu of Image for DOS appears. Image for DOS (GUI) is shown below.



To select menu items in Image for DOS, use the arrow keys to select the desired option and then press **Enter** to display the next screen. Some screens, such as the Restore Options screen, contain several sections of options; some of which can be toggled on or off. On these screens, use the **Tab** key to move from section to section. For options that you can toggle on and off, highlight the option using the arrow keys and then use the space bar to toggle the option on or off, as desired.

Image for DOS also makes wide use of accelerator keys. An accelerator key is an individual letter that can be pressed (or pressed in combination with the **Alt** key) to select an option or a menu item. In Image for DOS, accelerator keys are highlighted in yellow or are underlined.

How you use an accelerator key depends on the current location of the cursor; if it is in the same section of the screen as the desired accelerator key, simply press the applicable letter (i.e. the letter highlighted in yellow). If the cursor is in any other section, press and hold the **Alt** key, and then press the applicable letter.

You can use the **Esc** key or click **Back** to move back to the previous menu. If you use **Esc/Back** in this manner, Image for DOS remembers the selections you have already made throughout the Image for DOS session, in the event that you return to the same screen.

When using the GUI version of Image for DOS you can also use the mouse to select controls, toggle options, click buttons, etc.

Restoring the Backup

Insert your Image for DOS boot media into the appropriate drive or USB port and boot your computer. Then, follow these steps:

1. On the Image for DOS Main Menu, select **Restore**.

2. On the **Restore/Select** screen that appears, select an option to determine how Image for DOS handles the selection of the target drive and options:

   * If you choose **Automatic**, Image for DOS attempts to choose the target drive and options automatically using information stored in the backup files. If Image for DOS cannot identify the target drive and options or you don't accept the suggested target drive, Image for DOS will use the Normal option and ask you to select the target drive and options.

     Tip: Remember that you set the default values of many restore options when creating the boot media. Enter the INI file options on the appropriate page of the MakeDisk wizard. For example, if you wish the Automatic Restore to expand your partitions (**Scale to Fit**) you would include the **Expand=1** option in the **[Restore_Defaults]** section. See *Creating the Image for DOS Boot Media* in the Image for DOS manual.

     Note: Performing an automatic partial restore will not change the disk type (MBR/EMBR/GPT) of the destination drive if it doesn't match the type of the source drive.

   * If you choose **Normal**, Image for DOS will ask you to select the target drive and options.

Note: If you created a backup in Image for Linux or Image for Windows and restore using Image for DOS, Image for DOS might not be able to use the Automatic option because Image for DOS might not be able to match the disk signature in the backup with the target disk on the machine to which you want to restore. In this case, Image for DOS uses the Normal option, where you select the target drive and options.

3. From the **Restore From/Select File Access Method** screen that appears, select between the following options, which refer to the location where Image for DOS should look for the backup file you want to restore:

   * **File (Direct)** – This option allows you to look for image file(s) in a folder on a hard drive that does not have a drive letter assigned to it by DOS.

   * **File (CD/DVD)** – This option allows you to look for image file(s) on a CD/DVD/BD disc.

4. On the **Restore From/Select Drive Interface** screen that appears, select one of the following options. These options refer to how Image for DOS should attempt to access the hard drive or CD/DVD/BD drive where your image is stored:

   If you chose **File (Direct)** in Step 3, you can choose one of the following options:

   * **BIOS** – Locates and accesses drives using the system BIOS. Please note that any problems or limitations inherent to the system BIOS will apply.

   * **BIOS (Direct)** – Attempts to locate the hard drive using the system BIOS, but then attempts to access it directly, bypassing the BIOS. This can sometimes be helpful in cases where performance with the **BIOS** option is very poor. In order to get the most out of this option when creating an image, you should select a File (Direct)—rather than File (OS)—for the File Access Method of as the target for restoring the image.

Use BIOS (direct) when you are going to be accessing SATA hard drives and CD/DVD/BD drives at any time during the Restore process.

   * **USB** – Examines the attached USB controller, if any, for available hard drives.

   * **IEEE1394** – Examines the attached IEEE 1394 controller, if any, for available hard drives.

   * **Virtual Drive** – Select this option if the backup resides on a virtual drive. Use the screens that follow to navigate to and select the virtual drive containing the backup.

   If you chose **File (CD/DVD)** in Step 3, you can choose one of the following options:

   * **ATAPI** – Select this option if your CD/DVD/BD drive is an ATAPI device, and none of the other selections apply. This is the most common option.

   * **ASPI** – Select this option if your CD/DVD/BD drive will be accessed using an ASPI layer. (You must supply the ASPI driver for this option to work.)

   * **USB2** – Select this option if your CD/DVD/BD drive is attached to a USB 2 controller.

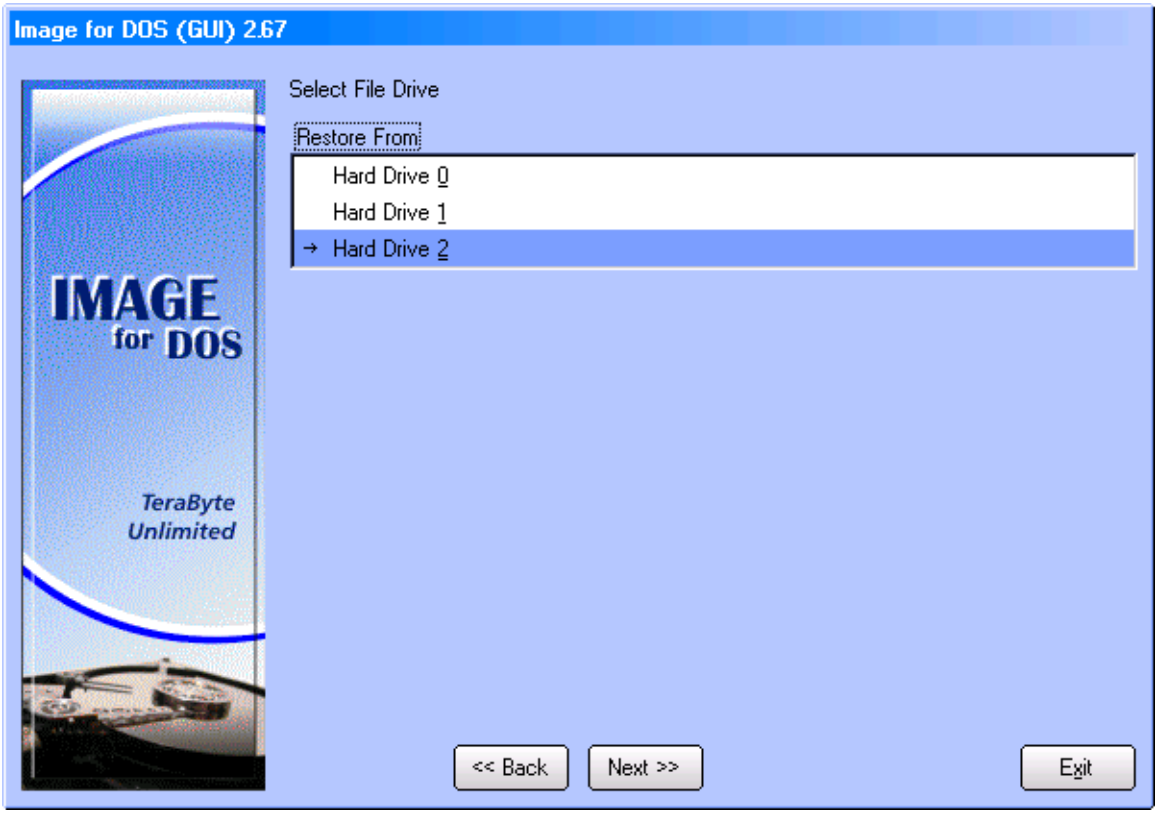
   * **IEEE1394** – Select this option if your CD/DVD/BD drive is attached to an IEEE 1394 controller.

If your USB device does not appear at first, please try pressing the Esc key, waiting a few seconds, and selecting the USB or USB2 option again.

5. Either the **Restore From/Select File Drive** screen shown in the following figure or the **Restore From/Select Target Drive** screen appears, depending

on whether you are restoring from a hard drive or from CD/DVD/BD discs. Select the target optical drive or hard drive.

*Note: If you select a hard drive, the **Restore From/Select File Location on HD** screen appears. You can select a partition on the hard drive if it contains partitions; otherwise, press Enter.*



6. On the **Restore From/File Name** screen that appears, navigate to and select the backup file you want to restore. Next, select either the entire drive or partitions to restore. The options you can set in Step 9 change, depending on your choice here. You can click the **Information** button to get details on the selected drive or partition (e.g. number of MiB used, free, and needed to restore).

*Note: If you select a differential or incremental backup to restore and Image for DOS is unable to locate any of the base images, you will be prompted to locate the required backup file(s). You will also have the option to restore in a single pass or in multiple passes. If you stored your backup on disc media (CD/DVD/BD), select the **Multi Pass** option.*

7. On the **Restore To/Select Drive Interface** screen that appears, select the access method you wish to use for the source hard drive. The choices on this screen are the same as the choices described under Step 4 if you chose File (Direct).

8. On the **Restore To/Select Target Drive** screen that appears, select the hard drive onto which you want to restore the image you selected in Step 6. Then, select the partition on that drive. The partition you select will be deleted before Image for DOS restores the image.

9. On the **Restore Options** screen that appears, select the options you want to use while restoring. For an explanation of each option, see the next two sections, "Image for DOS Restore Options for an Entire Drive" on Page 78 and "Image for DOS Restore Options for an Individual Partition" on Page 82.

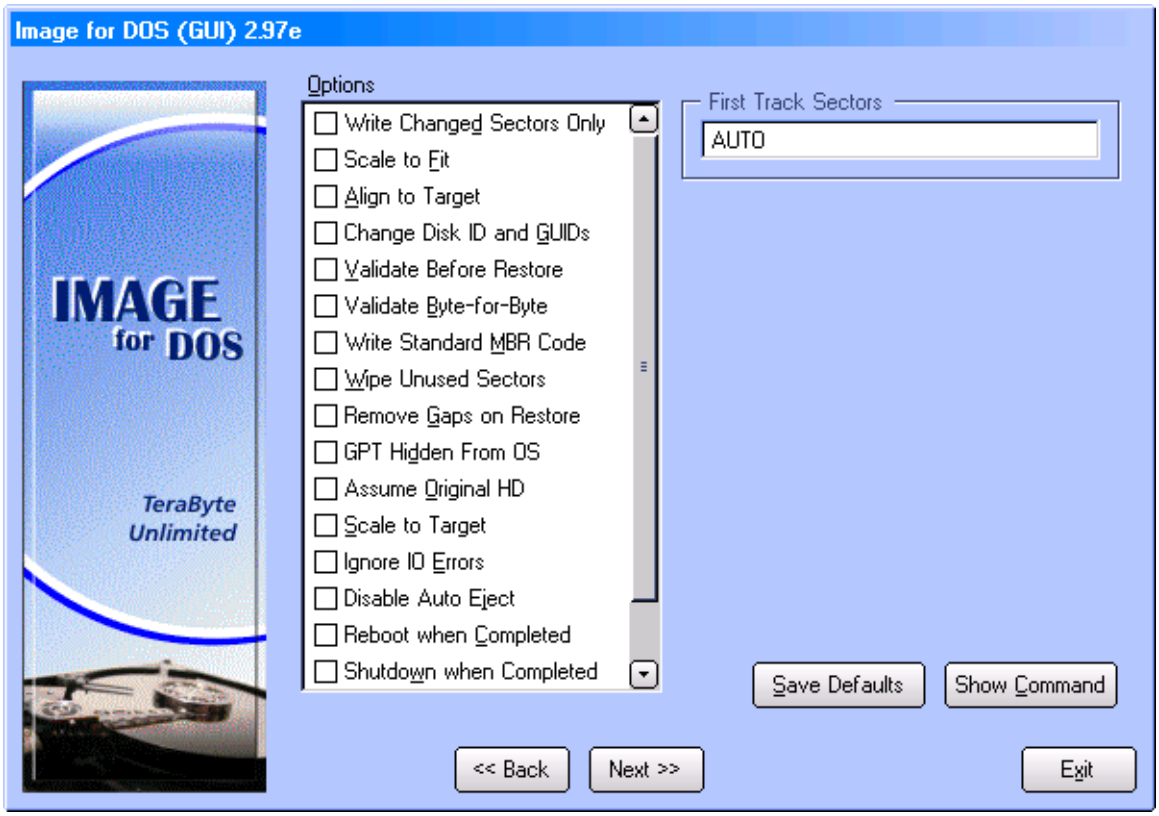
10. On the **Summary** screen that appears, click **Start** when you are ready to begin the restore process. During the restore process, a progress bar appears on-screen. A message appears when Image for DOS finishes.

After you press Enter, the main menu for Image for DOS reappears. At this point, if you are finished using Image for DOS, select **Exit**, remove the Image for DOS boot media, and then press **Enter** to reboot your computer.

Note: Until you reboot, the operating system reflects the contents of the drive/partition and file system in the state they were before you restored. Not rebooting can cause data corruption. You can override the reboot prompt by restoring using the command line `/rb:0` *switch, but do this only if you are an advanced user and understand the potential ramifications of not rebooting.*

Image for DOS Restore Options for an Entire Drive

You can set options to restore an image if you choose the Normal option instead of the Automatic option on the **Restore/Select** screen. The options you can set while restoring using Image for DOS depend on whether you restore an entire drive or a partition. When you restore an entire drive, Image for DOS offers these options that you can set:



Update Boot Partition - This option updates any references to the restored partition in the active boot partition on the target drive. This is useful for situations where the boot partition differs from the system partition. However, you typically wouldn't want to use this option if you're creating a copy of an existing partition you want to keep, unless the target drive will be independent of the original drive. For this to be useful, the active boot partition should already be on the target drive or part of the same copy or restore operation. Note: This option is not displayed if the **Automatic Boot Partition Update** global option is enabled (the default).

Write Changed Sectors Only – Enable this option when restoring to write only the changed sectors to the target drive (target will be read to compare). Useful in cases where a large portion of the data is the same and it's desirable to reduce wear on the target drive (e.g. restoring to SSD drive). This option is unavailable if not supported by the drive.

Scale to Fit – On FAT, FAT32, NTFS, or EXT 2/3/4 file systems, selecting this option will make Image for DOS assume that the size of the original hard drive is based on the location of the end of the last partition; Image for DOS then applies the same scaling to the target hard drive. If any unpartitioned space existed at the end of the source drive, that unpartitioned space won't exist on the target drive after you restore your image. This option has no effect on images restored to hard drives using other file systems. You cannot use this option in conjunction with the **Scale to Target** option. If you inadvertently enable both options, **Scale to Fit** will take precedence.

Align to Target – If you select this option, Image for DOS will force alignment to the target drive regardless of the alignment used on the source drive. For example, if the **Align Partitions on 1MiB Boundaries** global option is enabled the restored drive will be aligned on 1MiB boundaries. If this option is not selected, the alignment used on the target drive will be determined automatically based on the source drive.

Change Disk ID and GUIDs – This option only applies to full drive restores. It allows you to change the NT Signature restored to the target drive. For target GPT drives, the MBR NT Signature, the GPT Disk GUID, and the partition GUIDs will all be changed. This can be useful if you plan on having both the original and restored hard drive in the same computer at the same time; otherwise Windows may detect the duplicate signature and modify it which may (depending on the OS) prevent the restored hard drive from booting properly.

Validate Before Restore – If you select this option, Image for DOS will validate the image file(s) prior to restoring them, will perform internal consistency checks on the backup file(s). If Image for DOS encounters an error during validation, Image for DOS will abort the restore operation without overwriting the partition. If you select this option, the overall processing time Image for DOS takes to restore the image will increase, but you can restore the image with greater certainty that the restored image will be reliable.

Validate Byte-for-Byte – If you select this option, Image for DOS will verify that every byte in the source backup image file was written back to the drive correctly, ensuring 100% accuracy. This option generally increases the processing time of the overall backup operation, but is advisable to use where maximum reliability is required.

Write Standard MBR Code – If you select this option, Image for DOS will install standard master boot code to the Master Boot Record (MBR) after completing the restore operation. The other portions of the MBR (i.e. the partition table, disk signature, etc.) will not be affected. Otherwise, Image for DOS will only install the standard master boot code when it appears that there is no existing boot code.

Wipe Unused Sectors – This option will wipe (zero-out) unused sectors on the restored drive. When restoring a full drive, the entire drive is wiped, including all gaps between any partitions. Using this option provides an easy way to wipe a drive and restore in a single operation (such as when deploying images to used systems).

Remove Gaps on Restore – Select this option to remove any gaps (free space) between partitions. Partitions will be restored adjacent to each other.

GPT Hidden From OS – Use this option when restoring to a GPT drive to indicate that the operating system being restored will not see the destination drive as GPT when booted. For example, an iMac using BootCamp or cases where the 0xEE placeholder partition is missing from the MBR. Using this option prevents Image for DOS from using GPT specific fix-up information on the drive after the restore.

Assume Original HD – If you select this option, which mainly applies to Linux partitions, Image for DOS will keep references to the source hard drive number

intact within the partitions that have been restored to the target. If you do not select this option and the target drive number differs from that of the source drive, applicable drive references residing within the restored partitions will be updated to reflect the new hard drive number.

This option has no effect if you are restoring to a target drive whose number matches that of the source drive. If you are restoring to a target drive whose number differs from that of the source drive, but you plan to subsequently move the target drive so that its number matches the source drive again, enabling this option can be beneficial.

Scale to Target – If you use this option when restoring an image, Image for DOS restores the image proportionally to the target drive. For example, suppose that you backed up a 250 GB hard drive and restored the image to a 500 GB hard drive. If you use this option, you allow Image for DOS to double the size of the restored image. This option only works for FAT, FAT32, NTFS, and EXT2/3/4 file systems and has no effect on images restored to hard drives using other file systems. You cannot use this option in conjunction with the **Scale to Fit** option. If you inadvertently enable both options, **Scale to Fit** will take precedence.

Ignore IO Errors – Under ordinary circumstances, if Image for DOS encounters a bad sector on the target partition while restoring, Image for DOS will notify you concerning the write error and give you the option to continue or abort. If you select the Ignore IO Errors option, Image for DOS will ignore the error and continue. Generally, you should select this option only if you need to restore to a target drive that contains known bad sectors. On some systems, if you select this setting and Image for DOS encounters bad sectors, there will be a significant delay as the internal retry/recovery routine of the drive attempts to handle the bad sector(s). In addition, some systems may hang if the **BIOS** option is used to access the source drive. In such cases, try using the **BIOS (Direct)** option instead.

Disable Auto Eject – This option prevents Image for DOS from automatically opening the optical drive tray. If you don't select this option, Image for DOS will open the drive tray whenever a disc is needed and at the completion of the restore operation.

Reboot When Completed – Use this option to automatically reboot your computer after the restore finishes.

Shutdown When Completed – Use this option to automatically shut down your computer after the restore finishes.

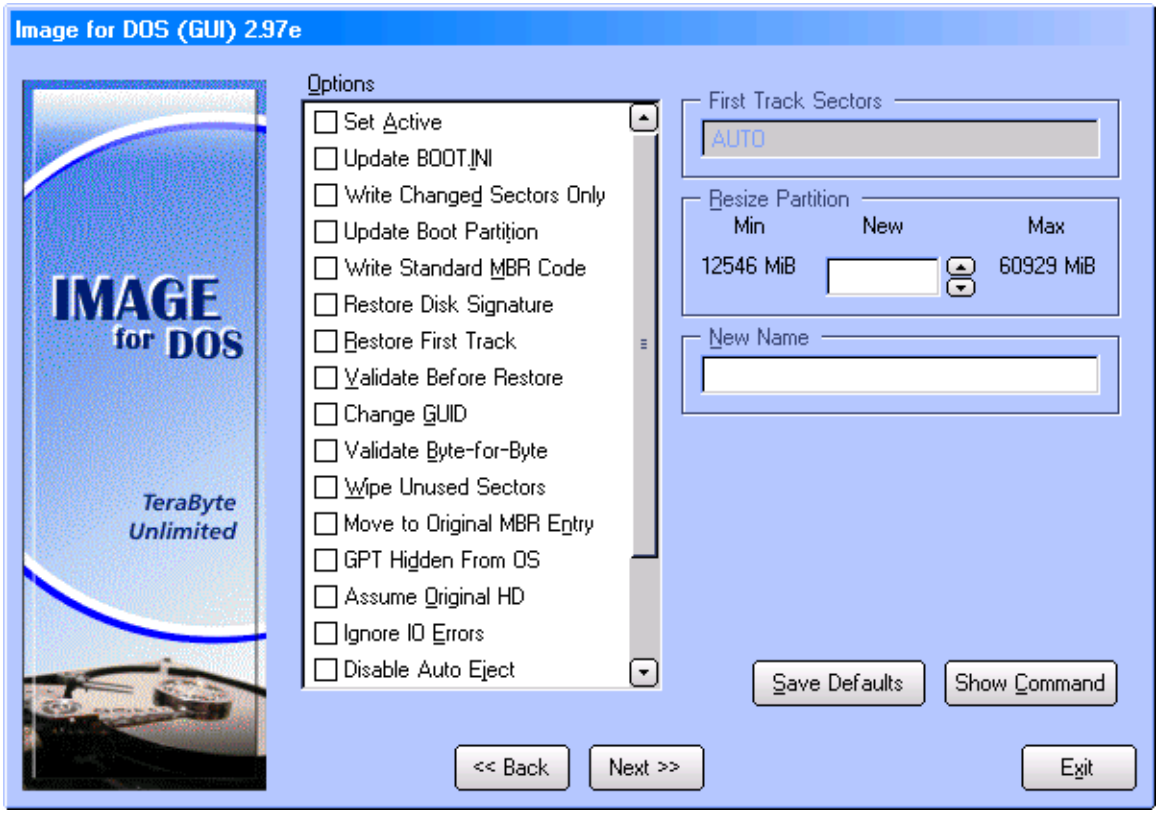
Log Results to File – Select this option to make Image for DOS log the date and time it completes the restore operation. Image for DOS saves the log as `IFD.LOG` in the `IMAGE.EXE` program directory. To be able to save `IFD.LOG`, Image for DOS must be running from a writable medium such as a non-write-protected floppy diskette or UFD. You can use the /logfile or LogFile options to specify an alternate location for `IFD.LOG`.

Change Volume SN – Select this option to change the file system volume serial number of copied FAT//FAT32/NTFS/HPFS partitions and the UUID of Ext2/3/4 partitions.

First Track Sectors – This text box allows you to specify how many sectors of the first track of the hard drive should be restored. If you enter AUTO in this box, the tracks needed for the EMBR will be restored. If you aren't sure, type AUTO in this box.

Image for DOS Restore Options for an Individual Partition

When you restore an individual partition, Image for DOS offers these options that you can set:



Set Active – If you select this option, Image for DOS will make the restored partition the active partition after completing the restore operation. Otherwise, Image for DOS will make the restored partition active only if no other partition is active and the target drive is HD0.

Update BOOT.INI – When you select this option, Image for DOS updates all partition(w) entries in the boot.ini file found in the restored location to point to itself. This can be useful when restoring Windows NT, Windows 2000, Windows XP, and Windows 2003 operating systems to a new drive or location.

Write Changed Sectors Only – Enable this option when restoring to write only the changed sectors to the target drive (target will be read to compare). Useful in cases

where a large portion of the data is the same and it's desirable to reduce wear on the target drive (e.g. restoring to SSD drive). This option is unavailable if not supported by the drive.

Update Boot Partition - This option updates any references to the restored partition in the active boot partition on the target drive. This is useful for situations where the boot partition differs from the system partition. However, you typically wouldn't want to use this option if you're creating a copy of an existing partition you want to keep, unless the target drive will be independent of the original drive. For this to be useful, the active boot partition should already be on the target drive or part of the same copy or restore operation.

Write Standard MBR Code – If you select this option, Image for DOS will install standard master boot code to the Master Boot Record (MBR) after completing the restore operation. The other portions of the MBR (i.e. the partition table, disk signature(s), etc.) will not be affected. Otherwise, Image for DOS will install the standard master boot code only when it appears that there is no existing boot code.

Restore Disk Signature – This option applies when you restore a partition that had been assigned a drive letter within Windows prior to being backed up. If you select this option, Image for DOS will restore the disk signature associated with the source partition. If you don't select this option, Image for DOS will use the disk signature already present in the MBR of the target drive; if none exists, Image for DOS will create one. If you are restoring a partition that had been assigned a drive letter in Windows and you wish to keep that drive letter assignment, select this option.

Restore First Track – Whenever you back up any partition, Image for DOS also backs up the first track of the source hard drive. If you select this option, Image for DOS will restore the first track, which includes the master boot code and the disk signature, enabling you to restore the MBR/EMBR. Restoring the first track may also change the disk type (MBR/EMBR/GPT) of the destination drive if it doesn't match that of the source drive (the restore will abort if the change is required and cannot be applied).

Validate Before Restore – If you select this option, Image for DOS will validate the image file(s) prior to restoring them. If Image for DOS encounters an error during validation, Image for DOS will abort the restore operation without overwriting the target.

Change GUID – When restoring to a GPT drive, selecting this option will change the GUID of each partition restored.

Validate Byte-for-Byte – If you select this option, Image for DOS will verify that every byte in the source data was restored correctly, ensuring 100% accuracy. This option generally doubles the processing time of the overall operation, but is advisable to use where maximum reliability is required. You can but do not need to select the **Validate Before Restore** option if you select the **Validate Byte-for-Byte** option.

Wipe Unused Sectors – This option will wipe (zero-out) unused sectors in the restored partition(s) or drive, depending on the type of restore performed.

When restoring single partitions or when restoring multiple partitions to a drive with existing partitions, sectors located outside of the restored partition(s) are not wiped. If a partition is resized during the restore, the wiped area for that partition is the final size of the restored partition (not the size of the source partition).

When restoring multiple partitions to a drive with no existing partitions, the entire drive is wiped, including all gaps between any partitions. Using this option provides an easy way to wipe a drive and restore in a single operation (such as when deploying images to used systems).

Move to Original MBR Entry – If you select this option, Image for DOS will move the partition table entry of the restored partition to the same location in the master partition table as it had on the source drive. Image for DOS will also move the existing partition table entry to another location rather than overwrite it. You may want to enable this option if you use an environment that tracks master partition table entries, such as Linux.

GPT Hidden From OS – Use this option when restoring to a GPT drive to indicate that the operating system being restored will not see the destination drive as GPT when booted. For example, an iMac using BootCamp or cases where the 0xEE placeholder partition is missing from the MBR. Using this option prevents Image for DOS from using GPT specific fix-up information on the drive after the restore.

Assume Original HD – If you select this option, which mainly applies to Linux partitions, Image for DOS will keep references to the source hard drive number intact within the partitions that have been restored to the target. If you do not select this option and the target drive number differs from that of the source drive, applicable drive references residing within the restored partitions will be updated to reflect the new hard drive number.

This option has no effect if you are restoring to a target drive whose number matches that of the source drive. If you are restoring to a target drive whose number differs from that of the source drive, but you plan to subsequently move the target drive so that its number matches the source drive again, enabling this option can be beneficial.

Ignore IO Errors – Under ordinary circumstances, if Image for DOS encounters a bad sector on the target drive while restoring an image, Image for DOS will notify you concerning the write error and give you the option to continue or abort. If you select the Ignore IO Errors option, Image for DOS will ignore the error and continue. Generally, you should select this option only if you need to restore to a target drive that contains known bad sectors. On some systems, if you select this setting and Image for DOS encounters bad sectors, there will be a significant delay as the internal retry/recovery routine of the drive attempts to handle the bad sector(s). In addition, some systems may hang if the **BIOS** option is used to access the source drive. In such cases, try using the **BIOS (Direct)** option instead.

Disable Auto Eject – This option prevents Image for DOS from automatically opening the optical drive tray. If you don't select this option, Image for DOS will open the drive tray whenever a disc is needed and at the completion of the restore operation.

Reboot When Completed – Use this option to automatically reboot your computer after the restore finishes.

Shutdown When Completed – Use this option to automatically shut down your computer after the restore finishes.

Log Results to File – Select this option to make Image for DOS log the date and time it completes the restore operation. Image for DOS saves the log as `IFD.LOG` in the `IMAGE.EXE` program directory. To be able to save `IFD.LOG`, Image for DOS must be running from a writable medium such as a non-write-protected floppy diskette or UFD. You can use the /logfile or LogFile options to specify an alternate location for `IFD.LOG`.

Change Volume SN – Select this option to change the file system volume serial number of copied FAT//FAT32/NTFS/HPFS partitions and the UUID of Ext2/3/4 partitions.

First Track Sectors – This text box allows you to specify how many sectors of the first track of the hard drive should be restored. If you enter `AUTO` in this box, the tracks needed for the EMBR will be restored. If you aren't sure, type `AUTO` in this box.

Resize Partition – Currently available only for FAT, FAT32, NTFS, and EXT 2/3/4 partitions, you can use this text box to specify a new size for the restored partition, bound by the **Min**imum and **Max**imum values specified by Image for DOS. The units used here are mebibytes, abbreviated MiB. (Please refer to the section titled **Data Storage Size Unit Conventions** at the beginning of this manual for more information.)

New Name – Enter the new volume name (label) for the restored partition. If left blank the name will not be changed from its restored value.

Restoring a Backup with Image for Windows

You can use Image for Windows to restore an image as long as you are not trying to restore the image to the copy of Windows you are currently using. Image for Windows can restore images to partitions not in use. To use Image for Windows to restore an image of a Windows installation when you have no other operating systems available, you can:

* Use Image for DOS, as described in the preceding two sections.

* Use Image for Linux, as described in the Image for Linux manual.

* Use TBWinPE or TBWinRE. TBWinPE is based on the Windows AIK/ADK (requires download from Microsoft). Windows 7 and Windows 8 users can easily create TBWinRE boot media (does not require downloading the Windows AIK/ADK) and add Image for Windows to the Windows Recovery Environment. The TBWinRE files are automatically installed in the *tbwinre* sub-folder of the Image for Windows installation folder and can be accessed there or from the

Create Recovery Boot Disk shortcut in the Start menu. Tutorials for creating TBWinPE and TBWinRE boot media can be found on TeraByte's website.

* Use the "PE Builder Plugin Installer" and create a Bart PE or other WinPE-based bootable Windows CD/DVD that also contains Image for Windows. When you boot your computer using this CD/DVD, you boot to a Windows preinstallation environment state, where you can use Image for Windows to restore your backup. Tutorials for creating a BartPE CD can be found on TeraByte's website.

Note: The version of Image for Windows installed in the BartPE and other WinPE-based media is a fully-functional product and you can use it to both back up and restore.

Using Image for Windows in BartPE

The Image for Windows plugin for Bart's PE Builder enables you to run Image for Windows in Bart's Preinstallation Environment (commonly referred to as BartPE). Essentially, BartPE provides you with a core Windows environment separate from your main Windows installation, allowing you to perform maintenance tasks you would not be able to perform from within the primary Windows environment itself. For example, running Image for Windows from BartPE will allow you to restore your Windows partition—something you cannot do while your Windows partition is in use. For more information on BartPE, please visit its home page.

Note: BartPE is a third-party product and is not included with Image for Windows. A plug-in to install Image for Windows in BartPE is included with Image for Windows, but, to obtain BartPE or to learn more about BartPE, please visit the BartPE home page: http://www.nu2.nu/pebuilder/. You'll also find a tutorial that guides you through creating a BartPE boot disc that contains Image for Windows at http://www.terabyteunlimited.com/howto/index.htm.

Before running Image for Windows in BartPE, you must first create the Image for Windows plugin for BartPE as well as the BartPE CD/DVD itself. Fortunately, this is a simple process. To create the Image for Windows BartPE plugin, follow these steps:

1. Choose Start, All Programs, Terabyte Unlimited, Image for Windows, V2, PE Builder Plugin Installer. The PE Builder Plug-In installer window will appear:

If you don't find this shortcut on your system, run Image for Windows setup again, being sure to select the component titled "PE Builder – PE plugin builder for BartPE, VistaPE…".

2. In the PE Builder Location text box, type in or navigate to the location where you installed BartPE (i.e. the folder containing PEBUILDER.EXE). Your path may differ from the one shown in the figure below.

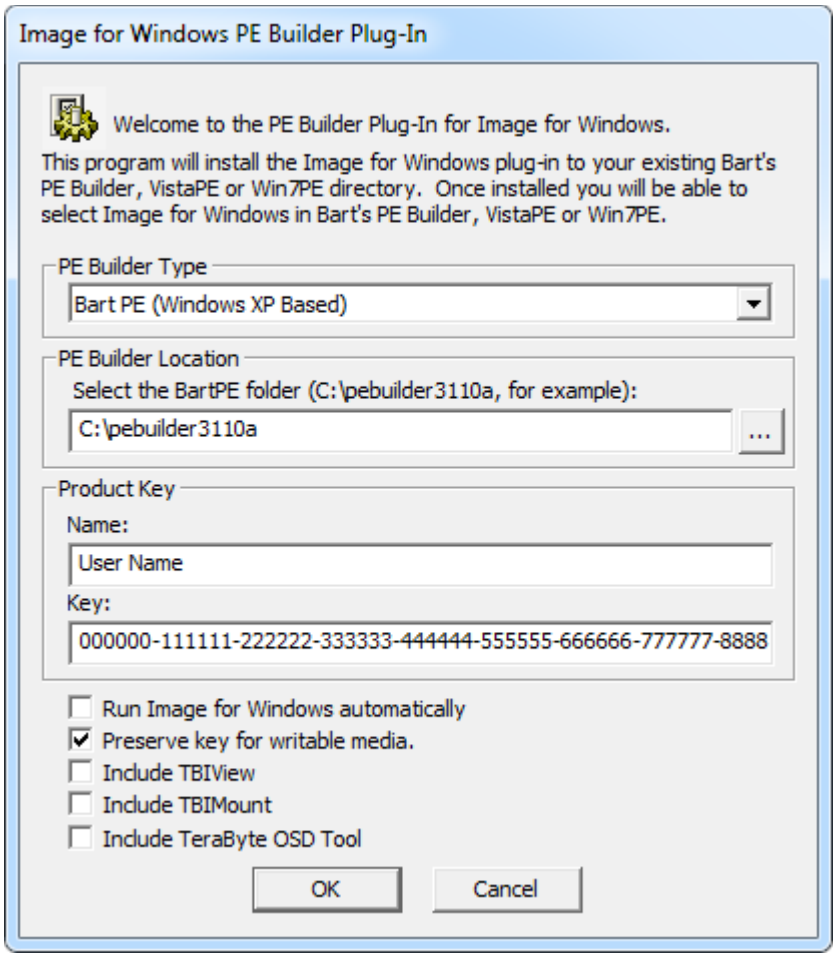


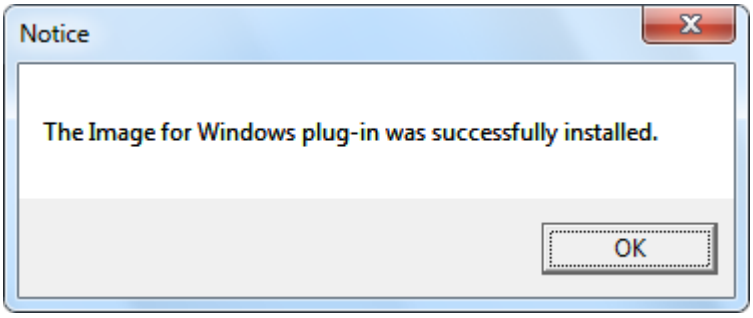
Image for Windows PE Builder Plug-In
Welcome to the PE Builder Plug-In for Image for Windows.
This program will install the Image for Windows plug-in to your existing Bart's PE Builder, VistaPE or Win7PE directory. Once installed you will be able to select Image for Windows in Bart's PE Builder, VistaPE or Win7PE.
PE Builder Type
Bart PE (Windows XP Based)
PE Builder Location
Select the BartPE folder (C:\pebuilder3110a, for example):
C:\pebuilder3110a
...
Product Key
Name:
User Name
Key:
000000-111111-222222-333333-444444-555555-666666-777777-8888
Run Image for Windows automatically
Preserve key for writable media.
Include TBIView
Include TBIMount
Include TeraByte OSD Tool
OK
Cancel

3. If you are a registered user of Image for Windows, use the Product Key section to supply your registration name and key in the corresponding text boxes. Please note that the BartPE plugin installer does *not* validate your registration information, so be sure to enter it correctly—copying and pasting is recommended. The registration information you supply here will be copied to a file named imagew.ini, which is used by the plugin so that you won't be prompted to enter your registration information each time you boot to the BartPE environment and run Image for Windows.

4. By default, Image for Windows will not run when BartPE starts up. Select the "Run Image for Windows automatically" option to make Image for Windows run automatically when BartPE loads. You can also select to include the TBIView, TBIMount, and TeraByte OSD Tool programs, if they are installed.

5. It is recommended to select the "Preserve key for writable media" option if the PE build will be saved to writable media (such as a flash drive).

6. Click OK. The installer will copy the applicable files to a folder named "plugin\ifwv2", which will reside directly under the folder you specified in the "PE Builder Location" text box. You should see a confirmation dialog when the installer has finished:



Tip: If you wish, you may create/edit the IFW.INI file that resides in the "plugin\ifwv2" folder to apply custom settings each time you run Image for Windows under BartPE. Editing the IFW.INI file to include those settings stores them so that you don't have to enter them manually each time you run Image for Windows under BartPE. Please refer to the section titled "Image for Windows INI File" for more information.

7. Run Bart's PE Builder to create the BartPE disc or .ISO file. The Image for Windows plugin is enabled by default.

If you need a utility to burn an .ISO file to disc, try TeraByte Unlimited's free BurnCDCC utility. You can install BurnCDCC as an optional component during Image for Windows setup or you can download it separately and install it.

If you are running Image for Windows in BartPE and an attached USB drive does not appear, try closing and then restarting Image for Windows.

Using Image for Windows to Restore an Image

To use Image for Windows to restore an image, run Image for Windows in Windows or run it by booting your computer from the TBWinPE/RE or BartPE media. Then, follow these steps:

1. Double-click the Image for Windows icon on your desktop or launch the program from its program group on the Start menu. (By default, Image for Windows will automatically launch when TBWinPE/RE is booted.)

2. On the Image for Windows Welcome window, select **Restore (Automatic)** or **Restore (Manual)**.

   * If you choose **Automatic**, Image for Windows attempts to choose the target drive and options automatically using information stored in the backup files. If Image for Windows cannot identify the target drive and options or you don't accept the suggested target drive, Image for Windows will use the Normal option and ask you to select the target drive and options.

     Tip: Remember that you can set the default values of many restore options by configuring the IFW.INI file. For example, if you wish the Automatic

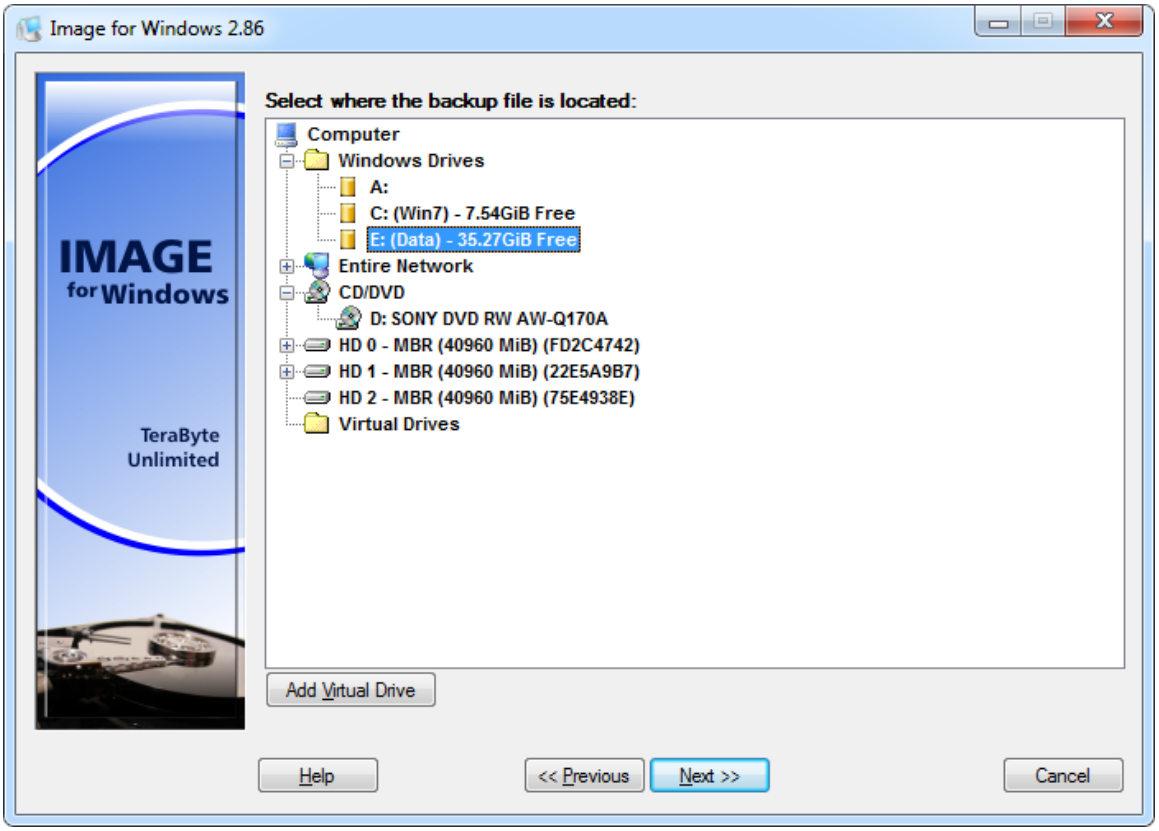
Restore to expand your partitions (**Scale to Fit**) you would include the **Expand=1** option in the **[Restore_Defaults]** section.

* If you choose **Normal**, Image for Windows will ask you to select the target drive and options.

Note: If you created a backup in Image for DOS or Image for Linux and restore using Image for Windows, Image for Windows might not be able to use the Automatic option because Image for Windows might not be able to match the disk signature in the backup with the target disk on the machine to which you want to restore. In this case, Image for Windows uses the Normal option, where you select the target drive and options.

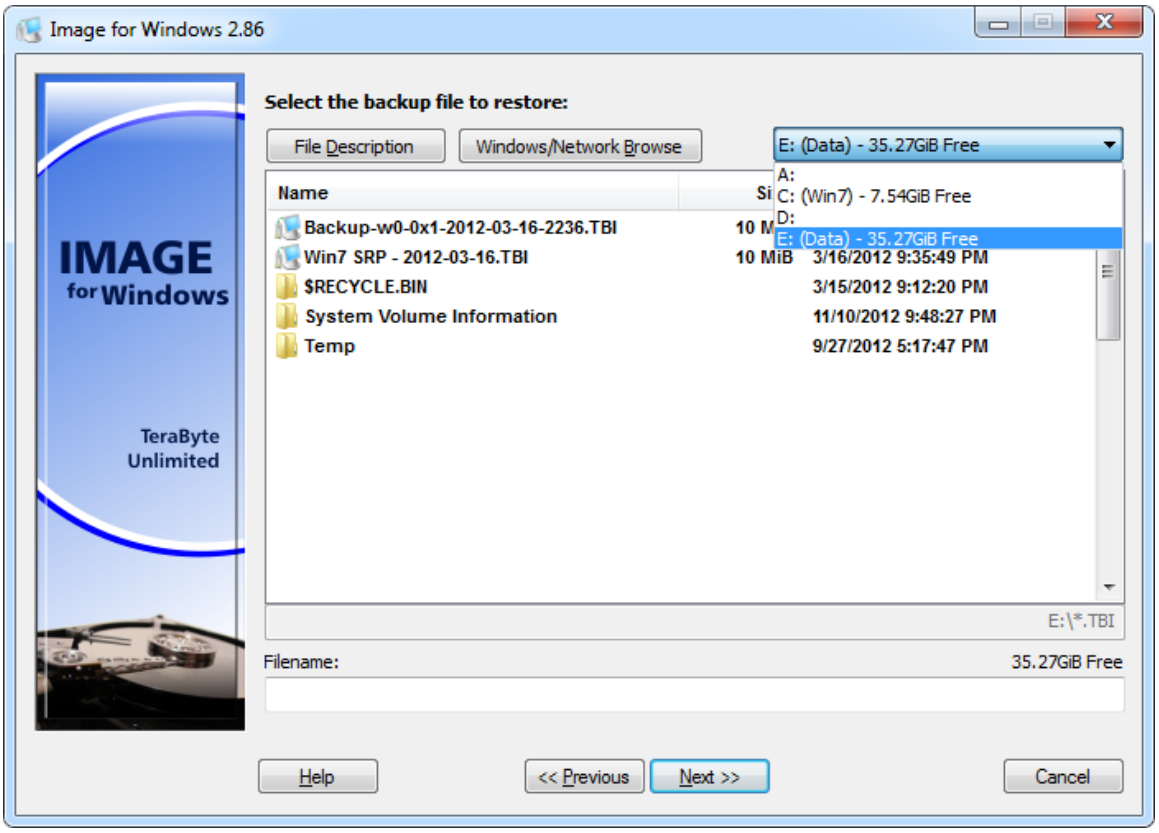
3. Click **Next**. In the window that appears, select the drive letter or device that contains the image you want to restore.

Note: If the device containing the image is a device that Image for Windows doesn't display, just highlight any Windows drive and continue to the next step.

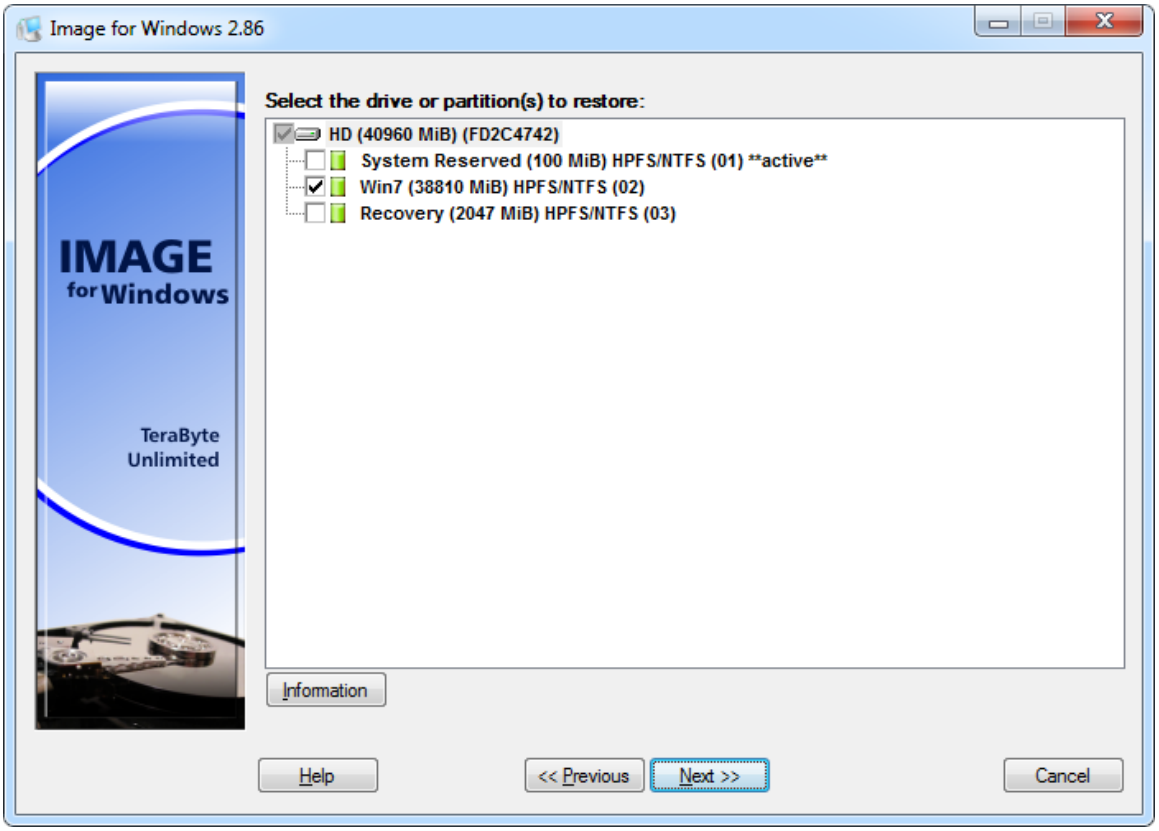


4. Click **Next**. At the top of the window that appears next, if necessary, open the list of drives and select the external drive containing the image to restore or click the Windows/Network Browse button to navigate to the drive; you can use UNC paths. Then, select the name of the image file you want to restore, which Image for Windows displays in the Filename box at the bottom of the window.

Note: If you select a differential or incremental backup to restore and Image for Windows is unable to locate all of the base images, you will be prompted to locate the required backup file(s).



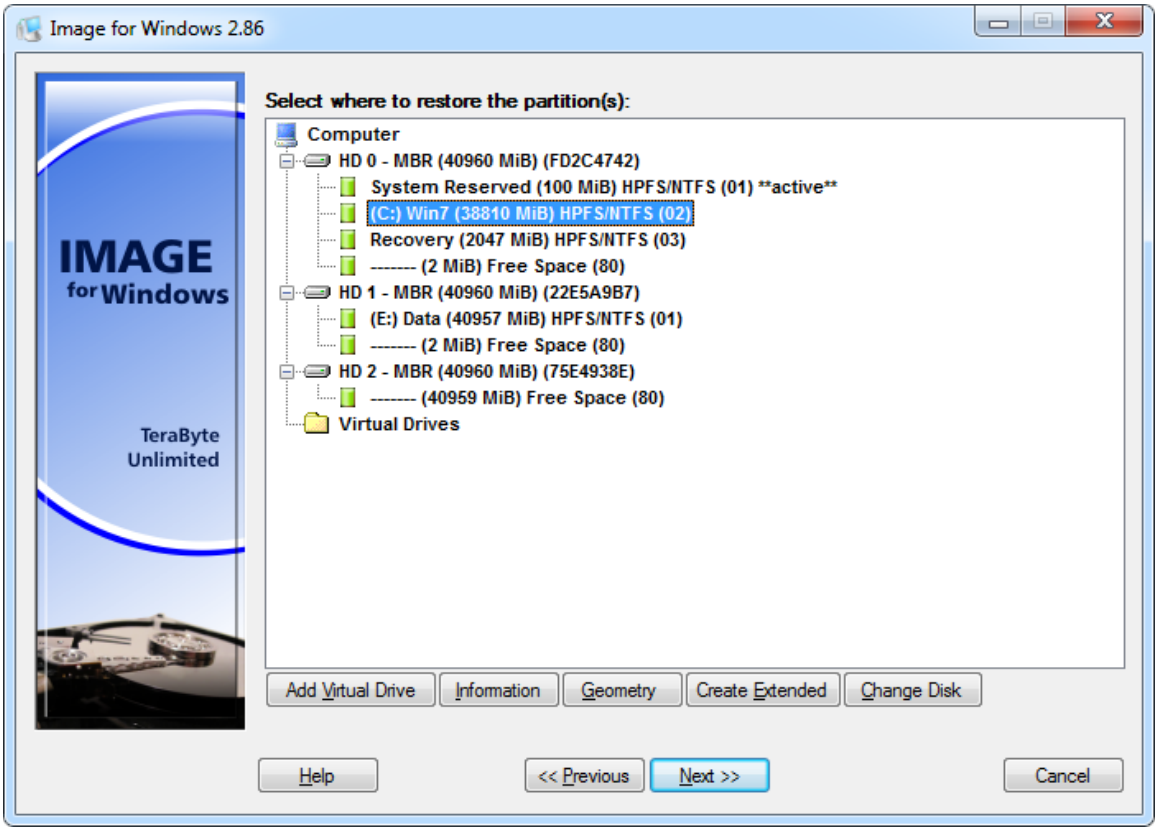
5. Click **Next**. In the window that appears, select the drive or partition to restore.



While on this screen, the following function is available:

- **Information** – Click to view the details of the selected drive or partition (e.g. number of MiB used, free, and needed to restore).

6. Click **Next**. In the window that appears, select the drive or partition where you want to restore the backup file.



While on this screen, the following functions are available:

- Right-click on a drive or partition to open the context menu: Select **Details** to view information about the drive/partition. To delete a partition, select **Delete** and then confirm the action (check the **Aggressive Delete** box if a normal attempt fails and you need to force the deletion). Note: You can also delete the partition by selecting it and pressing the **Del** key.

- **Information** – Click to view the details of the selected drive, partition or virtual drive (e.g. number of MiB used, free, and needed to restore).

- **Geometry** – Click to set the geometry for the selected (target) drive. Read more about this function in the “Geometry Settings” section below.

- **Create Extended** – Click after selecting a free space partition to create an extended partition. You can then restore the backup to that partition.

- **Change Disk** – Click to change the drive type. This allows you to change the partitioning scheme used on the drive. MBR, EMBR, and GPT drive types are supported.

- **Add Virtual Drive** – Click to add a virtual drive while working in Image for Windows.

  You can use Image for Windows to back up to or restore from a virtual drive used in conjunction with VirtualPC, VMWare, or Hyper-V. To add a virtual drive while working in Image for Windows, click the **Add Virtual Drive** button to display an Open dialog box. In the File name box, type the name of the virtual drive you want to add and click Open. If the virtual drive name you type doesn't exist, Image for Windows displays a message asking if you want to create a file for the virtual drive. Click Yes, and Image for Windows displays a dialog box where you can define the type and size of the virtual drive. You can specify the size in bytes by including no letters. Or, you can specify the size in Mebibytes by supplying an M or in Gibibytes by supplying a G.

  You can create any of the following types of virtual drives:

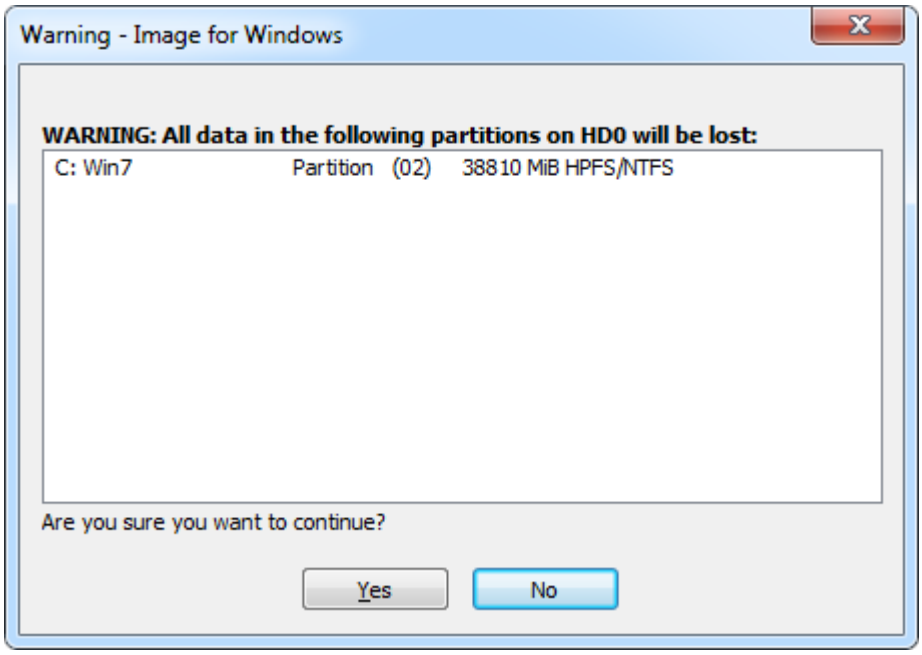
  - **RAW - Fixed Size** – Creates a plain (raw) file as the virtual drive. Its size is fixed and allocated with zeros on creation.[2]
  - **VHD - Dynamic Expanding** – Creates a VirtualPC Dynamic Expanding virtual hard drive.[1]
  - **VHD - Fixed Size** – Creates a VirtualPC Fixed Size virtual hard drive.[2]
  - **VHDX - Dynamic Expanding** – Creates a Hyper-V Dynamic Expanding virtual hard drive.[1,3]
  - **VHDX - Fixed Size** – Creates a Hyper-V Fixed Size virtual hard drive.[2,3]
  - **VHDX - Dynamic 4KiB Sector Size** – Creates a Hyper-V Dynamic Expanding virtual hard drive with a sector size of 4KiB (4096 bytes).[1,3]
  - **VHDX - Fixed Size 4KiB Sector Size** – Creates a Hyper-V Fixed Size virtual hard drive with a sector size of 4KiB (4096 bytes).[2,3]
  - **VMDK - Monolithic Sparse (IDE)** – Creates a VMWare Sparse IDE virtual hard drive.[1]
  - **VMDK - Monolithic Sparse (SCSI)** – Creates a VMWare Sparse SCSI virtual hard drive.[1]

  [1] Dynamic expanding virtual drives append data to the file as you add data to the virtual drive. The file size starts small and grows as needed.

  [2] Fixed size virtual drives allocate data for the file when it's created and the file size does not change. The file size will be the same as the virtual drive size (e.g. a 40GiB virtual drive will use 40GiB of space).

[3] For Windows caching reasons, it is highly recommended to create partitions within a VHDX file that are aligned on at least a 1MiB boundary. That is either 2048 sectors for 512 byte sized sectors or 256 sectors for 4096 byte sized sectors.

7. Click **Next**. A message appears, warning you that Image for Windows will overwrite the selected partition and all data currently in the selected partition will be lost.


Warning - Image for Windows
WARNING: All data in the following partitions on HD0 will be lost:
C: Win7 Partition (02) 38810 MiB HPFS/NTFS
Are you sure you want to continue?
Yes
No

8. Click Yes. In the window that appears, set the options you want Image for Windows to use during the restore operation. See the section, “Image for Windows Restore Options” on Page 97 for an explanation of each option.

If you click No, Image for Windows switches back to a Normal restore operation, where you select the target drive and partition as well as restore options.

9. If you are restoring from CD/DVD/BD discs, insert the first disc in the backup set.

10. On the **Summary** screen that appears, select **Start** when you are ready to begin the restore process. A progress bar appears on-screen. You can interrupt the backup and validation operations at any time by clicking **Cancel** or pressing the Esc key. Image for Windows will ask you to confirm that you want to cancel before it interrupts the current operation.

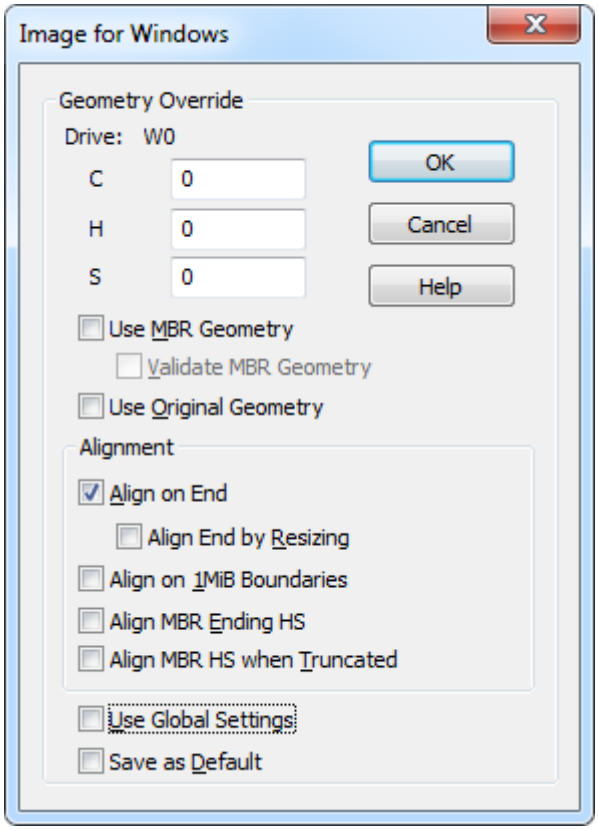
    While the restore is in process, you can change the power options and process priority options using the drop-down boxes. The default power option is Auto, which will prompt to reboot when finished if a reboot is necessary. If the selected power option is not supported by the system, the next one will be used in the following order: suspend, hibernate, shutdown. Select Exit Only to

have Image for Windows exit when finished. The selected process priority will remain in effect until the program ends or is changed manually.

Note: If Image for Windows reports that it cannot obtain a lock, you'll need to restore using the Image for DOS or Image for Linux recovery boot disk, or using Image for Windows from a preinstallation environment disc such as Bart PE, TBWinPE, or TBWinRE as mentioned earlier.

Geometry Settings

When you use the Restore (Normal) option, you can use the Geometry Override settings to set alignment options as well as a specific Cylinder (C), Head (H), or Sector (S) to use for a given drive. In addition to manually entering the values, you can select the Use Original Geometry option to have Image for Windows use the geometry from the backup image.



You'll need the CHS option when the geometry assigned by Windows to a given drive does not match the BIOS geometry for the drive. This situation occurs most often when you attach a hard drive from another machine to the USB port to restore the image.

C – Last Cylinder (0 to 1023)

H – Last Head (0 to 254)

S – Sectors per Track (1 to 63)

Use MBR Geometry – Use drive geometry based on the MBR entry of the first partition in the backup file. This is useful when restoring to a drive on a machine separate from where the drive will ultimately be booted.

Validate MBR Geometry - This option is used to ensure that the geometry from the MBR is aligned to known standards before accepting it for use. It only applies when *Use MBR Geometry* is enabled.

Use Original Geometry – Use the drive geometry saved in the backup file as opposed to the drive geometry of the machine where you're restoring the backup.

Note: Suppose that you move a drive from Machine A to Machine B and then back up Machine A's drive using Machine B. If you then restore this backup and select the Use Original Geometry option, Image for Windows restores the backup using the geometry from Machine B.

Align on End – Use this option to instruct Image for Windows to align restored partitions at the end of a cylinder, or when the *Align on 1MiB Boundaries* option is enabled, at the end of a 1MiB boundary.

Align End by Resizing – Use this option to make Image for Windows align both the beginning and end of a partition by resizing. This option works only on partitions that Image for Windows can resize.

Align on 1MiB Boundaries – Use this option to instruct Image for Windows to align restored partitions on 1MiB boundaries (drives with 512 byte sectors will be aligned on 2048 sectors; drives with 4096 byte sectors will be aligned on 256 sectors).

Align MBR Ending HS – Use this option to make Image for Windows force a restored partition's ending head and sector values in the MBR to match the current geometry.

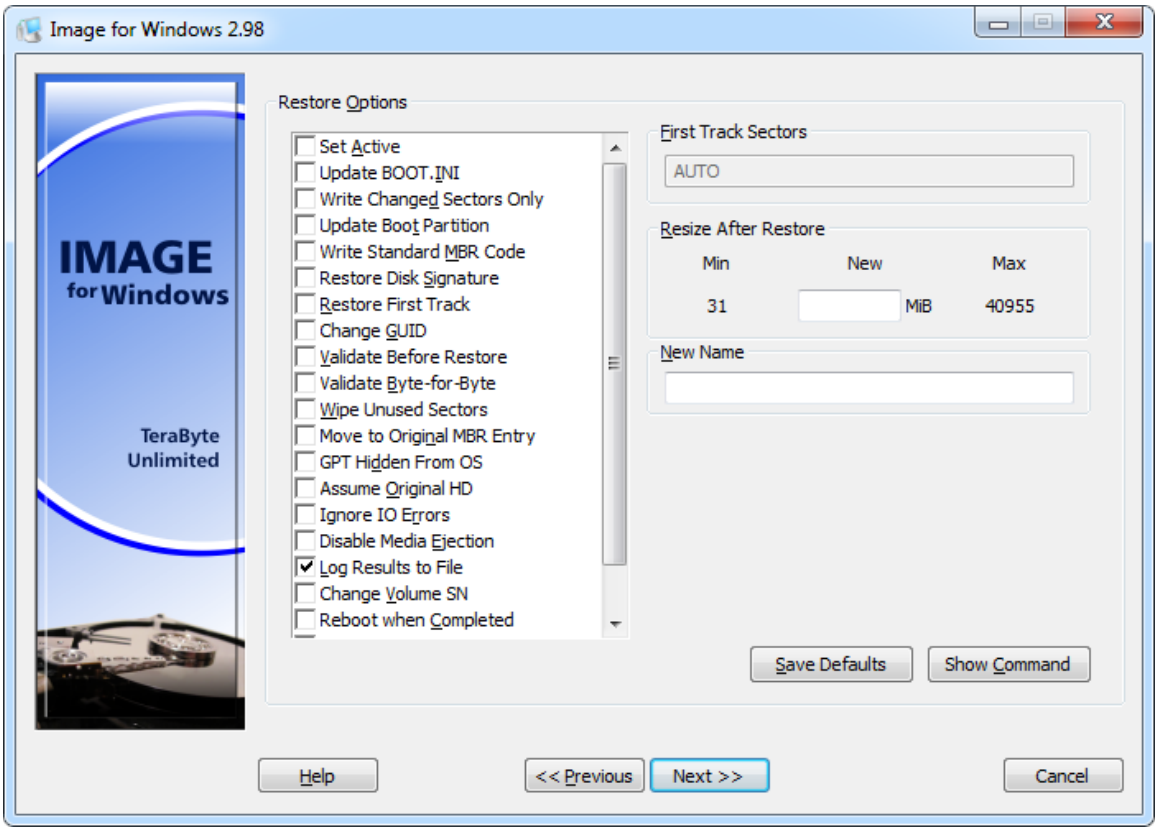
Align MBR HS when Truncated – Use this option to make Image for Windows set a restored partition's head and sector values in the MBR to match the current geometry when it is located outside the range of the current geometry.

Use Global Settings – Enable to allow global geometry settings to control the drive.

Save as Default – Select this option to save the current settings to the `IFW.INI` file as the defaults.

Image for Windows Restore Options

During the restore process, you can set a variety of options. These options will vary depending on whether you are restoring a full drive image or a partition image. Options available when restoring a partition are shown in the figure below.



Set Active – If you select this option, Image for Windows will make the restored partition the active partition after completing the restore operation. Otherwise, Image for Windows will make the restored partition active only if no other partition is active and the target drive is HD0.

Update BOOT.INI – When you select this option, Image for Windows will update all partition(w) entries in the boot.ini file found in the restored location to point to itself. This can be useful when restoring Windows NT, Windows 2000, Windows XP, and Windows 2003 operating systems to a new drive or location.

Write Changed Sectors Only – Enable this option when restoring to write only the changed sectors to the target drive (target will be read to compare). Useful in cases where a large portion of the data is the same and it's desirable to reduce wear on the target drive (e.g. restoring to SSD drive). This option is unavailable if not supported by the drive.

Update Boot Partition - This option updates any references to the restored partition in the active boot partition on the target drive. This is useful for situations where the boot partition differs from the system partition. However, you typically

wouldn't want to use this option if you're creating a copy of an existing partition you want to keep, unless the target drive will be independent of the original drive. For this to be useful, the active boot partition should already be on the target drive or part of the same copy or restore operation. Note: This option is not displayed when restoring a full drive image if the **Automatic Boot Partition Update** global option is enabled (the default).

Write Standard MBR Code – If you select this option, Image for Windows will install standard master boot code to the Master Boot Record (MBR) after completing the restore operation. The other portions of the MBR (i.e. the partition table, disk signature, etc.) will not be affected. Otherwise, Image for Windows will install the standard master boot code only when it appears that there is no existing boot code.

Restore Disk Signature – This option applies when you restore a partition that had been assigned a drive letter within Windows prior to being backed up. If you select this option, Image for Windows will restore the disk signature associated with the source partition. If you don't select this option, Image for Windows will use the disk signature already present in the MBR of the target drive; if none exists, Image for Windows will create one. If you are restoring a partition that had been assigned a drive letter in Windows and you wish to keep that drive letter assignment, select this option. For GPT drives the disk GUID will not be changed.

Restore First Track – Whenever you back up any partition, Image for Windows also backs up the first track of the source hard drive. If you select this option, Image for Windows will restore the first track, which includes the master boot code and the disk signature. This enables you to restore the MBR/EMBR. Restoring the first track may also change the disk type (MBR/EMBR/GPT) of the destination drive if it doesn't match that of the source drive (the restore will abort if the change is required and cannot be applied).

Change GUID – When restoring to a GPT drive, selecting this option will change the GUID of each partition restored.

Validate Before Restore – If you select this option, Image for Windows will validate the image file(s) prior to restoring them and perform internal consistency checks on the backup file(s). If Image for Windows encounters an error during validation, Image for Windows will a bort the restore operation without overwriting the partition. If you select this option, the overall processing time Image for Windows takes to restore the image will increase, but you can restore the image with greater certainty that the restored image will be reliable.

Validate Byte-for-Byte – If you select this option, Image for Windows will verify that every byte in the source backup image file was written back to the drive correctly, ensuring 100% accuracy. This option generally increases the processing time of the overall backup operation, but we advise you use this option where maximum reliability is required.

Wipe Unused Sectors – This option will wipe (zero-out) unused sectors in the restored partition(s) or drive, depending on the type of restore performed.

When restoring single partitions or when restoring multiple partitions to a drive with existing partitions, sectors located outside of the restored partition(s) are not wiped. If a partition is resized during the restore, the wiped area for that partition is the final size of the restored partition (not the size of the source partition).

When restoring a full drive or when restoring multiple partitions to a drive with no existing partitions, the entire drive is wiped, including all gaps between any partitions. Using this option provides an easy way to wipe a drive and restore in a single operation (such as when deploying images to used systems).

Move to Original MBR Entry – If you select this option, Image for Windows will move the partition table entry of the restored partition to the same location in the master partition table as it had on the source drive. Image for Windows will also move the existing partition table entry to another location rather than overwrite it. You may want to enable this option if you use an environment that tracks master partition table entries, such as Linux.

GPT Hidden From OS – Use this option when restoring to a GPT drive to indicate that the operating system being restored will not see the destination drive as GPT when booted. For example, an iMac using BootCamp or cases where the 0xEE placeholder partition is missing from the MBR. Using this option prevents Image for Windows from using GPT specific fix-up information on the drive after the restore.

Assume Original HD – If you select this option, which mainly applies to Linux partitions, Image for Windows will keep references to the source hard drive number intact within the partitions that have been restored to the target. If you do not select this option and the target drive number differs from that of the source drive, applicable drive references residing within the restored partitions will be updated to reflect the new hard drive number.

This option has no effect if you are restoring to a target drive whose number matches that of the source drive. If you are restoring to a target drive whose number differs from that of the source drive, but you plan to subsequently move the target drive so that its number matches the source drive again, enabling this option can be beneficial.

Ignore IO Errors – Under ordinary circumstances, if Image for Windows encounters a bad sector on the target drive while restoring an image, Image for Windows will notify you concerning the write error and give you the option to continue or abort. If you select the Ignore IO Errors option, Image for Windows will ignore the error and continue. Generally, you should select this option only if you need to restore to a target drive that contains known bad sectors. On some systems, if you select this setting and Image for Windows encounters bad sectors, there will be a significant delay as the internal retry/recovery routine of the drive attempts to handle the bad sector(s).

Disable Media Ejection – When removable media is used, this option prevents Image for Windows from automatically ejecting the removable media. If you don't select this option, Image for Windows will eject the media whenever new media is needed, and at the completion of the restore operation.

Log Results to File – Select this option to make Image for Windows log the details of the restore operation. By default, Image for Windows saves the log as `IFW.LOG` in the `IMAGEW.EXE` program folder. You can use program settings or the /logfile or LogFile options to specify an alternate location for `IFW.LOG`. Note that Image for Windows must be able to write to the specified folder to save the log.

Change Volume SN – Select this option to change the file system volume serial number of copied FAT//FAT32/NTFS/HPFS partitions and the UUID of Ext2/3/4 partitions.

Reboot when Completed – Select this option to have Image for Windows request that the computer reboot after completing the restore operation.*

Shutdown when Completed – Select this option to have Image for Windows request that the computer shut down after completing the restore operation.*

Suspend when Completed – Select this option to have Image for Windows request that the computer suspend (sleep) after completing the restore operation. If a shutdown or reboot is required, a shutdown is performed instead.*

Hibernate when Completed – Select this option to have Image for Windows request that the computer hibernate after completing the restore operation. If a shutdown or reboot is required, a shutdown is performed instead.*

*If multiple power options are selected, precedence is as follows: suspend, hibernate, shutdown, reboot.

Scale to Fit – This option only applies to full drive restores. On FAT, FAT32, NTFS, or EXT 2/3/4 file systems, selecting this option will make Image for Windows assume that the size of the original hard drive is based on the location of the end of the last partition; Image for Windows then applies the same scaling to the target hard drive. If any unpartitioned space existed at the end of the source drive, that unpartitioned space won't exist on the target drive after you restore your image. This option has no effect on images restored to hard drives using other file systems. You cannot use this option in conjunction with the **Scale to Target** option. If you inadvertently enable both options, **Scale to Fit** will take precedence.

Align to Target – This option only applies to full drive restores. If you select this option, Image for Windows will force alignment to the target drive regardless of the alignment used on the source drive. For example, if the **Align Partitions on 1MiB Boundaries** global option is enabled the restored drive will be aligned on 1MiB boundaries. If this option is not selected, the alignment used on the target drive will be determined automatically based on the source drive.

Change Disk ID and GUIDs – This option only applies to full drive restores. It allows you to change the NT Signature restored to the target drive. For target GPT drives, the MBR NT Signature, the GPT Disk GUID, and the partition GUIDs will all be changed. This can be useful if you plan on having both the original and restored hard drive in the same computer at the same time; otherwise Windows may detect the duplicate signature and modify it which may (depending on the OS) prevent the restored hard drive from booting properly.

Remove Gaps on Restore – This option only applies to full drive restores. Select this option to remove any gaps (free space) between partitions. Partitions will be restored adjacent to each other.

Scale to Target – This option only applies to full drive restores. If you use this option when restoring an image, Image for Windows restores the image proportionally to the target drive. For example, suppose that you backed up a 250 GB hard drive and restored the image to a 500 GB hard drive. If you use this option, you allow Image for Windows to double the size of the restored image. This option only works for FAT, FAT32, NTFS, and EXT 2/3/4 file systems and has no effect on images restored to hard drives using other file systems. You cannot use this option in conjunction with the **Scale to Fit** option. If you inadvertently enable both options, **Scale to Fit** will take precedence.

First Track Sectors – This text box allows you to specify how many sectors of the first track of the hard drive should be restored. If you enter AUT0 in this box, the tracks needed for the EMBR will be restored. If you aren't sure, type AUT0 in this box.

Resize After Restore – Currently available only for FAT, FAT32, NTFS, and EXT 2/3/4 partitions, you can use this text box to specify a new size for the restored partition, bound by the **Min**imum and **Max**imum values specified by Image for Windows. The units used here are mebibytes, abbreviated MiB. (Please refer to the section titled **Data Storage Size Unit Conventions** at the beginning of this manual for more information.)

New Name – Enter the new volume name (label) for the restored partition. If left blank the name will not be changed from its restored value.

Save Defaults – Click this button to save the settings you establish. In the future, Image for Windows will display these settings automatically.

Show Command – Click this button to display the information you would type at a command prompt to start a restore with the options you selected as you displayed the various windows in Image for Windows. You can use this information to create a batch file or TBScript (.TBS) file that runs Image for Windows by selecting the **Save to File** option. The command line can be edited before being saved. For details on using Image for Windows from a command prompt, see the section, "Running Image for Windows from the Command Line" on Page 124.

Validating Backups with Image for Windows

You can use Image for Windows to validate backups at the time you create them and also before you restore a backup. You also can validate a backup at any time using the instructions provided below.

When you validate a backup, Image for Windows performs internal consistency checks on the backup file(s), helping to ensure that the backup will be reliable if you need to restore from it.

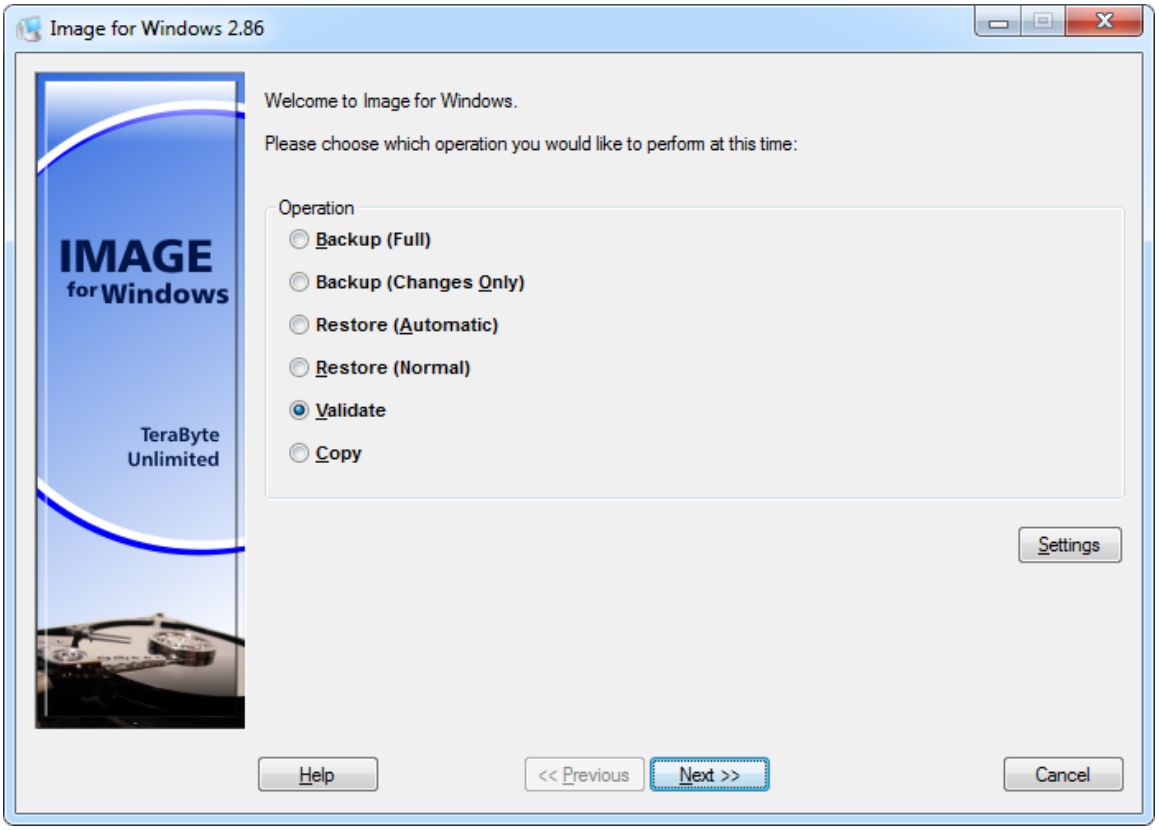
Tip: You should consider validating your backup images using your Image for DOS, Image for Linux, or BartPE/WinPE recovery media to make sure that you can see your backups while working in the recovery environment.

Validating a Backup

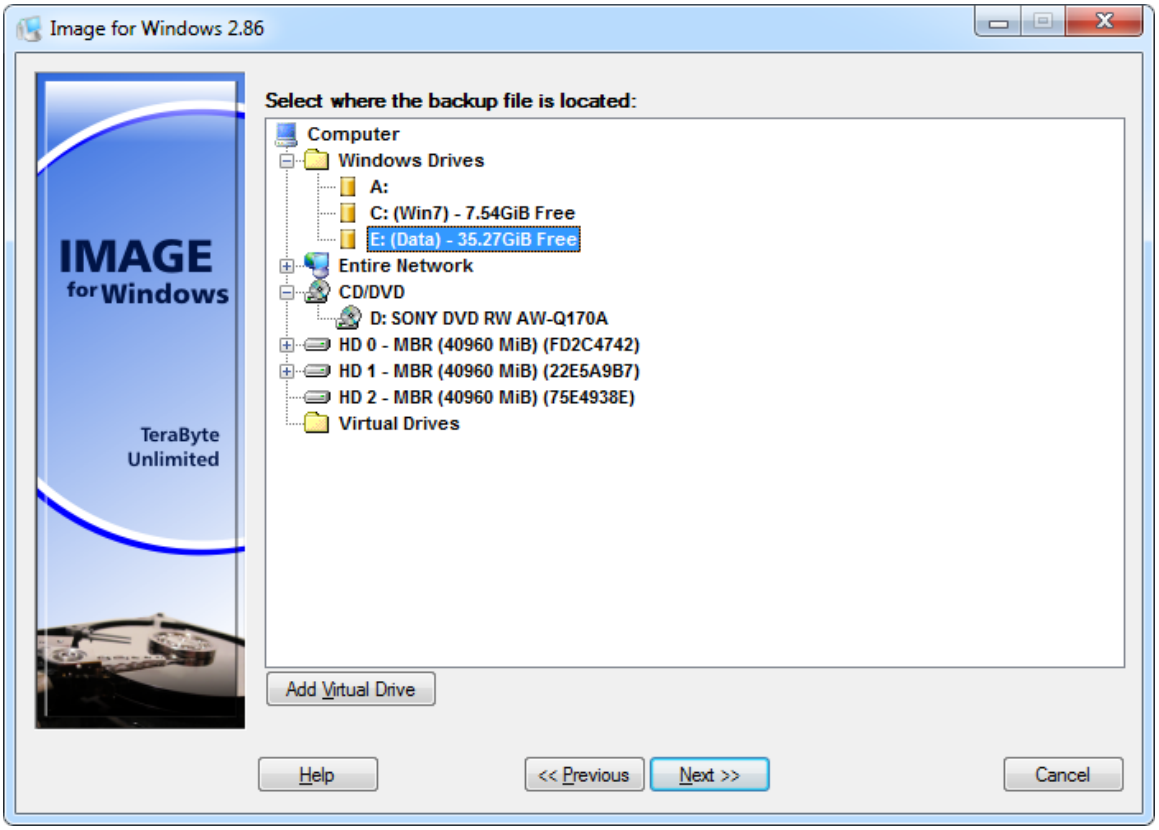
When you use the steps that follow to validate a backup, Image for Windows performs a standard validation, not the byte-for-byte validation that provides a more intense scrutiny of a backup file. You can perform a byte-for-byte validation only as part of a backup operation. See the section, “Setting Backup Options” on Page 48 for details on a byte-for-byte validation.

1. Double-click the Image for Windows icon on your desktop or launch the program from its program group on the Start menu.

2. On the Image for Windows Welcome window, select **Validate**.

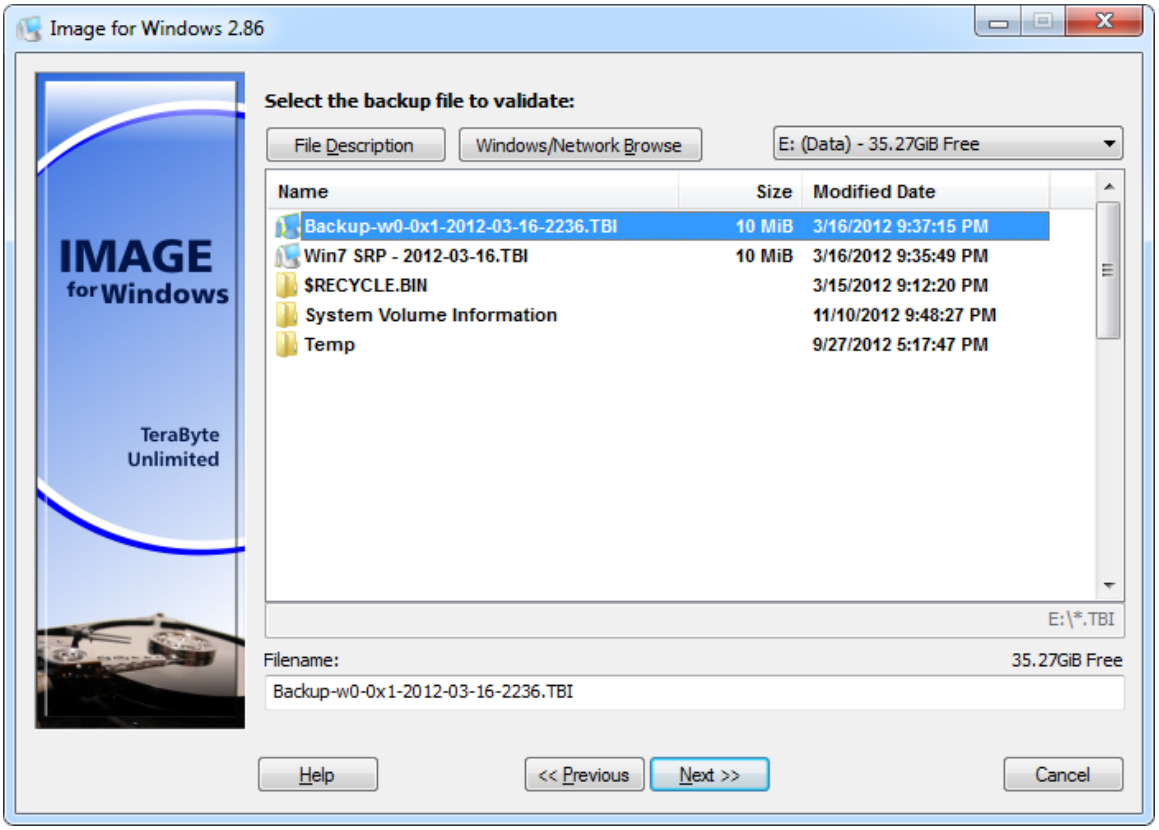


3. Click **Next**. Image for Windows searches your network for resources that might contain backup files. In the window that appears, select the hard drive, partition, or virtual drive containing the image you want to validate.



Note: If you want to validate an image stored on a device that Image for Windows doesn't display, just highlight any Windows Drive and continue to the next step.

4. Click **Next**. In the window that appears, select the file you want to validate. At the top of the window, open the list of drives and select the drive containing the image file you want to validate. If you stored the file on a drive Image for Windows doesn't display or on network drive, you can click the Windows/Network Browse button to navigate to the drive. After you select the file, the name of the file appears in the Filename box at the bottom of the window.



5. Click **Next**. If you selected a differential or incremental backup to validate and Image for Windows is unable to locate all of the base images, you will be prompted to locate the required backup file(s). Otherwise, in the window that appears, select the drive or partition(s) to validate. Click **Next**. Set the options you want Image for Windows to use while validating. See the next section, "Understanding Validation Options" on Page 105 for an explanation of these options.

6. If you are validating from CD/DVD/BD discs, make sure the first disc is inserted.

7. On the **Summary** screen that appears, select **Start** when you are ready to begin the validation process. A progress bar appears on-screen. You can interrupt the operation at any time by clicking **Cancel** or pressing the Esc key. Image for Windows will ask you to confirm that you want to cancel before it interrupts the operation.

   While the validation is in process, you can change the power options and

process priority options using the drop-down boxes. If the selected power option is not supported by the system, the next one will be used in the following order: suspend, hibernate, shutdown. Select Exit Only to have Image for Windows exit when finished. The selected process priority will remain in effect until the program ends or is changed manually.

When Image for Windows finishes, a window appears to inform you that Image for Windows successfully validated the selected backup. You can click **Close**.

Understanding Validation Options

There are several options available when you validate an image:

Log Results to File – Select this option to make Image for Windows log the details of the validation operation. Image for Windows saves the log as `IFW.LOG` in the directory where you installed Image for Windows. You can use program settings or the /logfile or LogFile options to specify an alternate location for `IFW.LOG`. Note that Image for Windows must be able to write to the specified folder to save the log.

Disable Media Ejection – When removable media is used, this option prevents Image for Windows from automatically ejecting the removable media. If you don't select this option, Image for Windows will eject the media whenever new media is needed, and at the completion of the validate operation.

Save Defaults – Click this button to save the settings you establish. In the future, Image for Windows will display these settings automatically.

Show Command – Click this button to display the information you would type at a command prompt to start a validation with the options you selected as you displayed the various windows in Image for Windows. You can use this information to create a batch file or TBScript (.TBS) file that runs Image for Windows by selecting the **Save to File** option. The command line can be edited before being saved. For details on using Image for Windows from a command prompt, see the section, "Running Image for Windows from the Command Line" on Page 124.

Copying Partitions or Drives with Image for Windows

You can use the Copy operation to place an copy of the contents of one partition or drive on another partition or drive. Suppose, for example, that you have a hard drive all set up and configured just the way you want it, and you want to clone that setup so that you can place it in another computer. You can use the Copy operation.

Copying a Partition or Drive

Using the Copy operation, Image for Windows makes a sector-by-sector copy of the used areas of the partition or drive you select and places that copy on the partition or drive you designate, overwriting any information stored on the target location. If

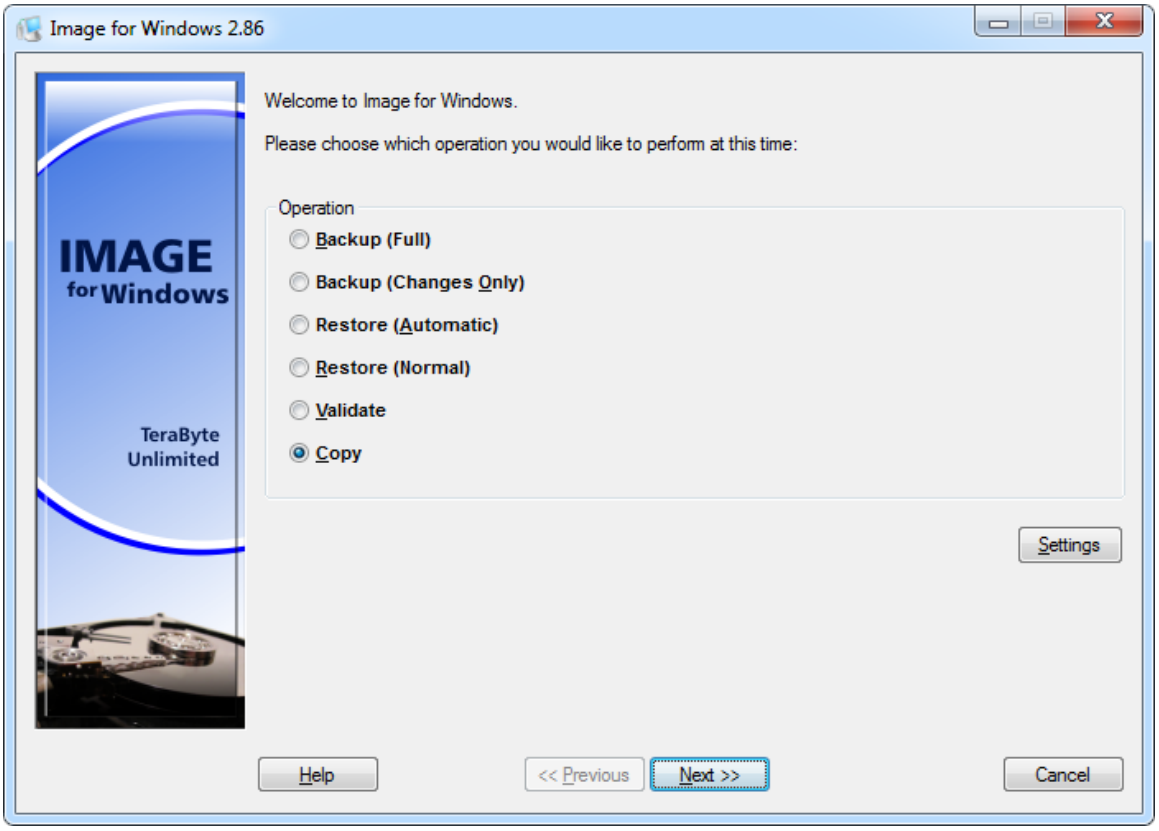
the partition or drive you copy is a bootable partition or drive, the copy will also be bootable.

Note: Unless you copy an entire drive, Image for Windows does not automatically set the copy as the active boot partition unless you select the Set Active option.

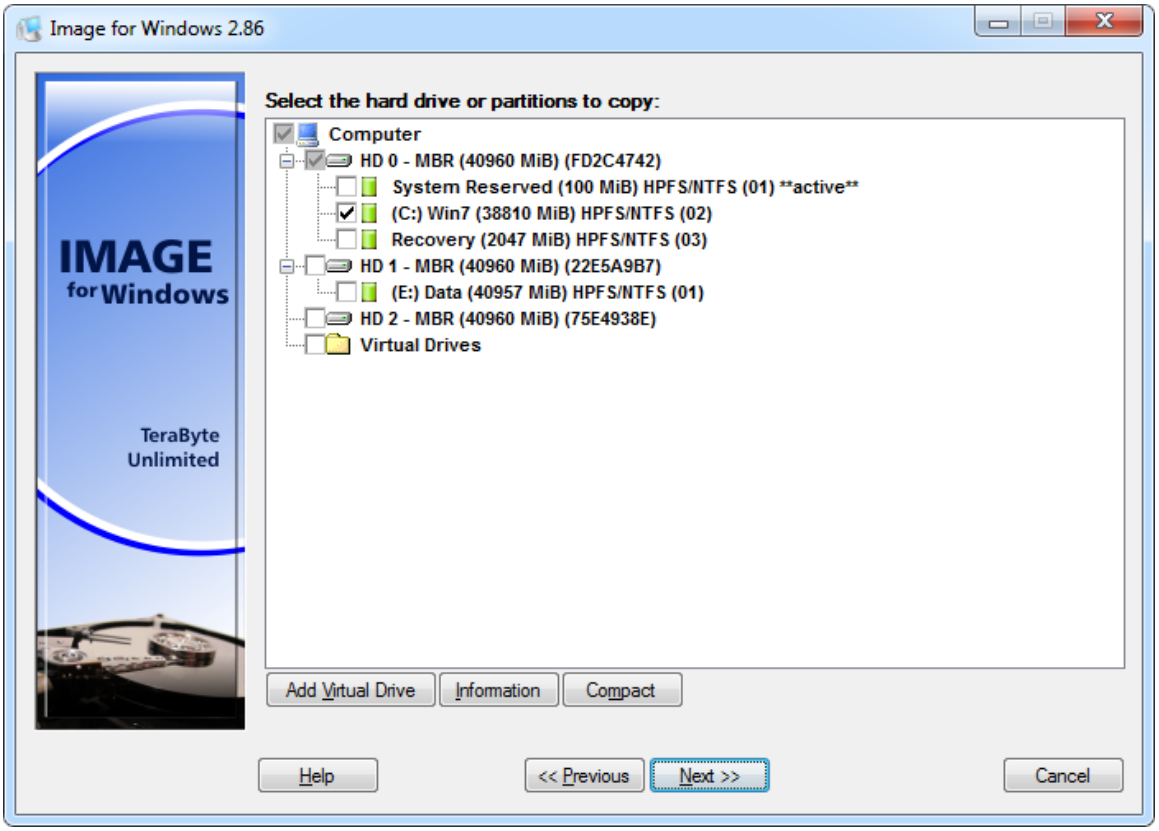
To create a copy of a partition or drive, follow these steps:

1. Double-click the Image for Windows icon on your desktop or launch the program from its program group on the Start menu.

2. On the Image for Windows Welcome window, select **Copy**.



3. Click **Next**. In the window that appears, select the hard drive, partition, or virtual drive that you want to copy.



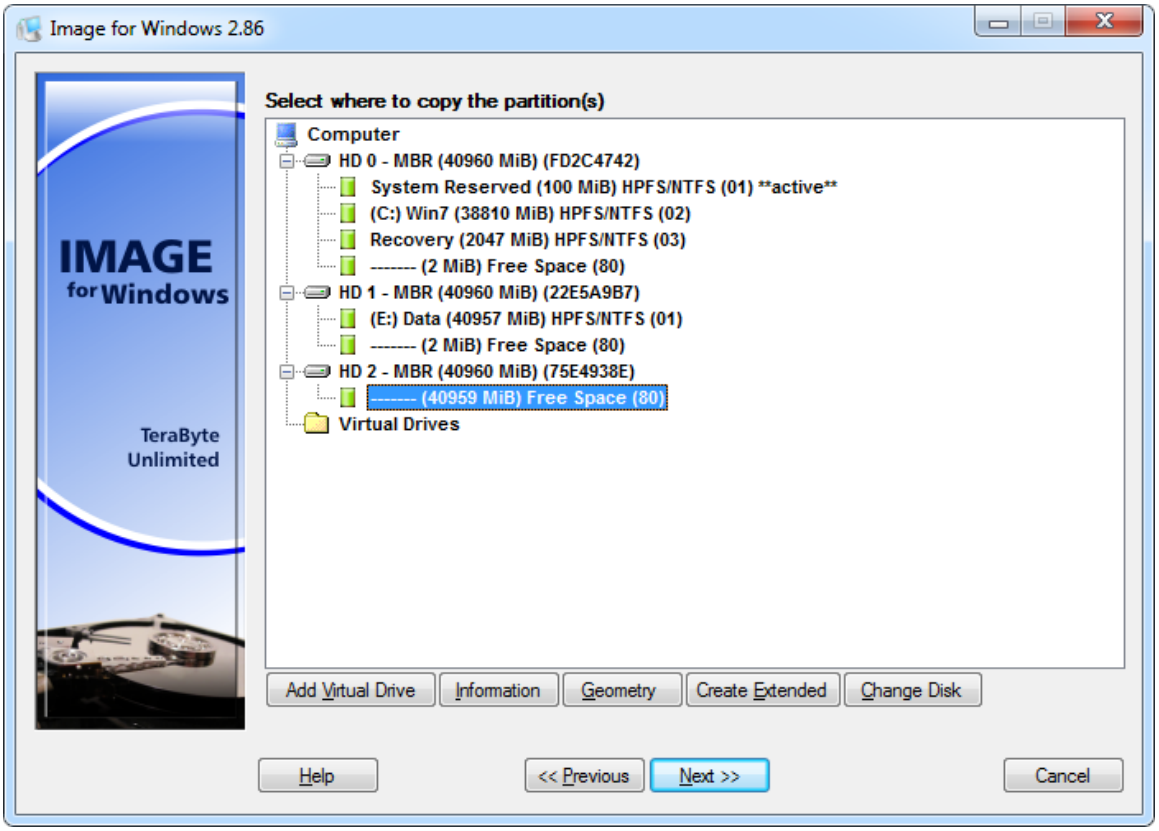
When a partition is highlighted, the following options are available:

Information – Click the **Information** button to view the details of the partition (used space, free space, size needed to restore, etc.).

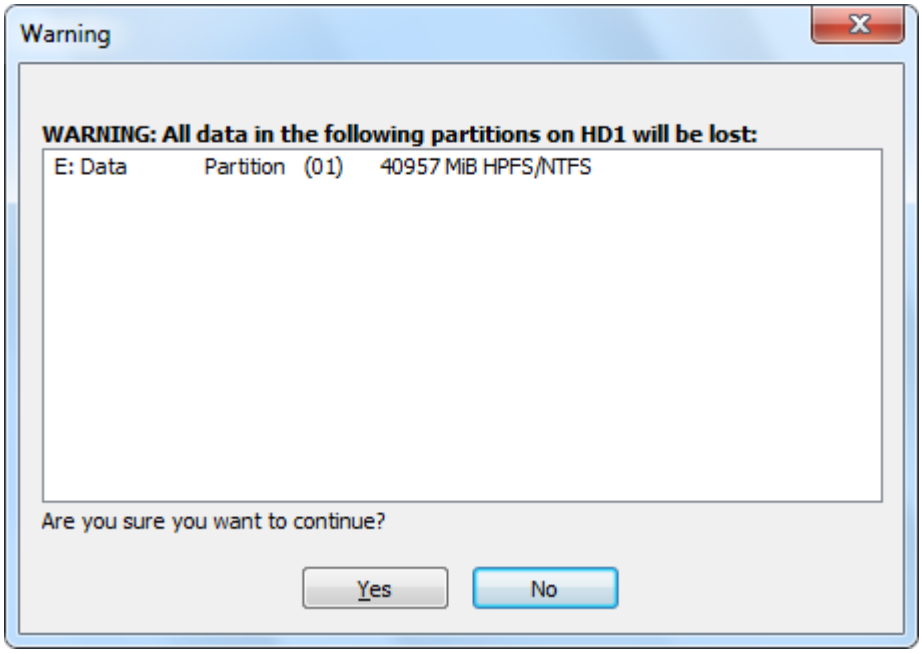
Compact – Click the **Compact** button to compact the partition's file system. FAT/FAT32 and NTFS file systems are supported. This option allows you to reduce the size required for a copy. You will be prompted to confirm the compaction and then asked for the compaction value (size in MiB).

For example, if you have a 250GB partition that contains 50GB of data and requires 150GB of space to restore and you need to copy it to a 100GB partition, you can compact the file system to under 100GB before copying it to the 100GB partition.

4. Click **Next**. In the window that appears, select the partition, drive, or free space where you want to save the copy.



5. Click **Next**. If the selected destination contains data, Image for Windows displays a warning that indicates that all data in the partition or on the drive that you selected in Step 4 will be overwritten and lost.


Warning
WARNING: All data in the following partitions on HD1 will be lost:
E: Data Partition (01) 40957 MiB HPFS/NTFS
Are you sure you want to continue?
Yes
No

6. Click **Yes** to display the Options window. See “Understanding Copy Options” for a detailed description of each option.

7. Select any options you want to use and click **Next**.

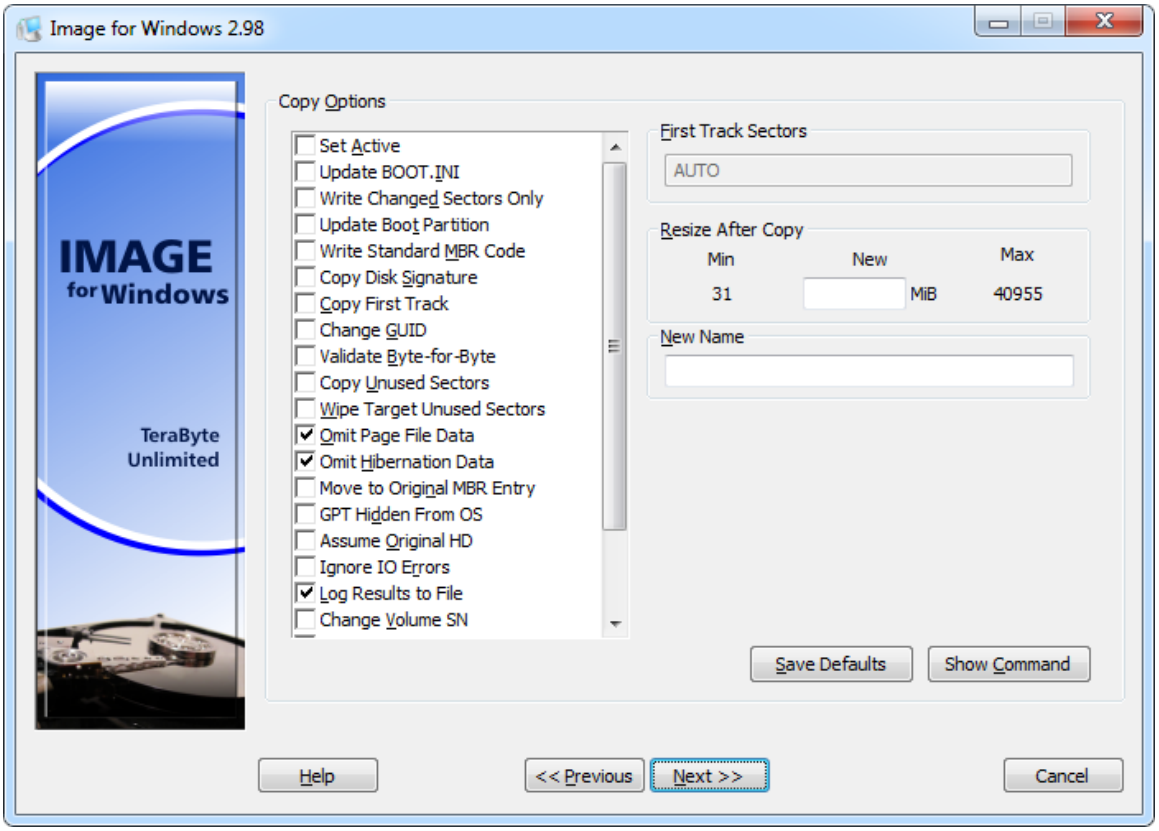
8. On the **Summary** screen that appears, click **Start** when you are ready to begin the Copy process. A progress bar appears on-screen. You can interrupt the operation at any time by clicking **Cancel** or pressing the Esc key. Image for Windows will ask you to confirm that you want to cancel before it interrupts the operation.

   While the copy is in process, you can change the power options and process priority options using the drop-down boxes. The default power option is Auto, which will prompt to reboot when finished if a reboot is necessary. If the selected power option is not supported by the system, the next one will be used in the following order: suspend, hibernate, shutdown. Select Exit Only to have Image for Windows exit when finished. The selected process priority will remain in effect until the program ends or is changed manually.

When Image for Windows finishes, a window appears to inform you that Image for Windows created the copy successfully. You can click **Close**.

Understanding Copy Options

During the copy process, you can set a variety of options. These options will vary depending on whether you are copying an entire disk or a partition. Options available when copying a partition are shown in the figure below.



Set Active – If you select this option, Image for Windows will make the copied partition the active partition after completing the copy operation. Otherwise, Image for Windows will make the copied partition active only if no other partition is active and the target drive is HD0.

Update BOOT.INI – When you select this option, Image for Windows will update all partition(w) entries in the boot.ini file found in the target location to point to itself. This can be useful when copying Windows NT, Windows 2000, Windows XP, and Windows 2003 operating systems to a new drive or location.

Write Changed Sectors Only – Enable this option when copying to write only the changed sectors to the target drive (target will be read to compare). Useful in cases where a large portion of the data is the same and it's desirable to reduce wear on the target drive (e.g. copying partition to SSD drive). This option is unavailable if not supported by the drive.

Update Boot Partition - This option updates any references to the copied partition in the active boot partition on the target drive. This is useful for situations where the boot partition differs from the system partition. However, you typically wouldn't want to use this option if you're creating a copy of an existing partition you want to keep, unless the target drive will be independent of the original drive. For this to be useful, the active boot partition should already be on the target drive or part of the same copy operation. Note: This option is not displayed when copying a full drive if the **Automatic Boot Partition Update** global option is enabled (the default).

Write Standard MBR Code – If you select this option, Image for Windows will install standard master boot code to the Master Boot Record (MBR) after completing the copy operation. The other portions of the MBR (i.e. the partition table, disk signature, etc.) will not be affected. Otherwise, Image for Windows will install the standard master boot code only when it appears that there is no existing boot code.

Copy Disk Signature – This option applies when you copy a partition that had been assigned a drive letter within Windows. If you select this option, Image for Windows will copy the disk signature associated with the source partition. If you don't select this option, Image for Windows will use the disk signature already present in the MBR of the target drive; if none exists, Image for Windows will create one. If you are copying a partition that had been assigned a drive letter in Windows and you wish to keep that drive letter assignment, select this option. For GPT drives the disk GUID will not be changed.

Copy First Track – If you select this option, Image for Windows will copy the first track of the source hard drive, which includes the master boot code and the disk signature. This enables you to restore the MBR/EMBR. Copying the first track may also change the disk type (MBR/EMBR/GPT) of the destination drive if it doesn't match that of the source drive (the copy will abort if the change is required and cannot be applied).

Change GUID – When copying to a GPT drive, selecting this option will change the GUID of each partition copied.

Validate Byte-for-Byte – If you select this option, Image for Windows will verify that every byte in the source location was written to the target location correctly, ensuring 100% accuracy. This option generally increases the processing time of the overall operation, but we advise you use this option where maximum reliability is required.

Copy Unused Sectors – By default, Image for Windows copies only sectors in use. If you select this option, Image for Windows will copy all sectors on a partition or drive, regardless of whether they contain data. For entire drive copies, this option causes a raw sector by sector backup (and later restore) of the entire drive without regard to any partitions or adjustments. NOTE: This option will cause Validate Byte-for-Byte to fail if PHYLock is used (VSS is not allowed). This option also causes Image for Windows to ignore the Omit Page File Data and Omit Hibernation Data options.

Wipe Target Unused Sectors – This option will wipe (zero-out) unused sectors in the copied partition(s) or drive, depending on the type of copy performed.

When copying single partitions or when copying multiple partitions to a drive with existing partitions, sectors located outside of the copied partition(s) are not wiped. If a partition is resized during the copy, the wiped area for that partition is the final size of the copied partition (not the size of the source partition).

When copying a full drive or when copying multiple partitions to a drive with no existing partitions, the entire drive is wiped, including all gaps between any

partitions. Using this option provides an easy way to wipe a drive and copy to it in a single operation.

Omit Page File Data – Selected by default, this option eliminates page file data from the copy process.

Omit Hibernation Data – Selected by default, this option eliminates hibernation data from the copy process.

Move to Original MBR Entry – If you select this option, Image for Windows will move the partition table entry of the copied partition to the same location in the master partition table as it had on the source drive. Image for Windows will also move the existing partition table entry to another location rather than overwrite it. You may want to enable this option if you use an environment that tracks master partition table entries, such as Linux.

GPT Hidden From OS – Use this option when copying to a GPT drive to indicate that the operating system being copied will not see the destination drive as GPT when booted. For example, an iMac using BootCamp or cases where the 0xEE placeholder partition is missing from the MBR. Using this option prevents Image for Windows from using GPT specific fix-up information on the drive after the copy completes.

Assume Original HD – If you select this option, which mainly applies to Linux partitions, Image for Windows will keep references to the source hard drive number intact within the partitions that have been copied to the target location. If you do not select this option and the target drive number differs from that of the source drive, applicable drive references residing within the restored partitions will be updated to reflect the new hard drive number. This option is useful when copying Linux partitions.

Ignore IO Errors – Under ordinary circumstances, if Image for Windows encounters a bad sector on the target drive while copying, Image for Windows will notify you concerning the write error and give you the option to continue or abort. If you select the Ignore IO Errors option, Image for Windows will ignore the error and continue. Generally, you should select this option only if you need to copy to a target drive that contains known bad sectors. On some systems, if you select this setting and Image for Windows encounters bad sectors, there will be a significant delay as the internal retry/recovery routine of the drive attempts to handle the bad sector(s).

Log Results to File – Select this option to make Image for Windows log the details of the copy operation. By default, Image for Windows saves the log as `IFW.LOG` in the `IMAGEW.EXE` program folder. You can use program settings or the /logfile or LogFile options to specify an alternate location for `IFW.LOG`. Note that Image for Windows must be able to write to the specified folder to save the log.

Change Volume SN – Select this option to change the file system volume serial number of copied FAT//FAT32/NTFS/HPFS partitions and the UUID of Ext2/3/4 partitions.

Reboot When Completed – Selecting this option tells Image for Windows to reboot the computer after completing the Copy operation.*

Shutdown When Completed - Selecting this option tells Image for Windows to shut down the computer after completing the Copy operation.*

Suspend when Completed – Select this option to have Image for Windows request that the computer suspend (sleep) after completing the restore operation. If a shutdown or reboot is required, a shutdown is performed instead.*

Hibernate when Completed – Select this option to have Image for Windows request that the computer hibernate after completing the restore operation. If a shutdown or reboot is required, a shutdown is performed instead.*

*If multiple power options are selected, precedence is as follows: suspend, hibernate, shutdown, reboot.

Disable TRIM – Reduces the amount of caching required for the source drive on systems with TRIM enabled by disabling TRIM during the copy operation. When TRIM is enabled the original contents of deleted sectors must be cached, whereas a normal delete doesn't overwrite the sectors and instead just updates the directory entry. **Note:** If the operation doesn't complete (due to reboot, shutdown, process forced to end, etc.) TRIM will stay disabled until enabled using the Windows fsutil program (`fsutil behavior set DisableDeleteNotify 0`). If IFW completes the operation, even with errors reported, TRIM will be properly reset to the enabled state.

Scale to Target – This option only applies to full drive copies. If you use this option when copying a disk or partition, Image for Windows copies the image proportionally to the target drive. For example, suppose that you want to copy a 250 GB hard drive to a 500 GB hard drive. If you use this option, you allow Image for Windows to double the size of the copy. This option only works for FAT, FAT32, NTFS, and EXT 2/3/4 file systems and has no effect on copies made to hard drives using other file systems. You cannot use this option in conjunction with the **Scale to Fit** option. If you inadvertently enable both options, **Scale to Fit** will take precedence.

Scale to Fit – This option only applies to full drive copies. On FAT, FAT32, NTFS, EXT 2/3/4 file systems, selecting this option will make Image for Windows assume that the size of the original hard drive is based on the location of the end of the last partition; Image for Windows then applies the same scaling to the target hard drive. If any unpartitioned space exists at the end of the source drive, that unpartitioned space won't exist on the target drive after you restore your image. This option has no effect on copies made to hard drives using other file systems. You cannot use this option in conjunction with the **Scale to Target** option. If you inadvertently enable both options, **Scale to Fit** will take precedence.

Align to Target – This option only applies to full drive copies. If you select this option, Image for Windows will force alignment to the target drive regardless of the alignment used on the source drive. For example, if the **Align Partitions on 1MiB Boundaries** global option is enabled the restored drive will be aligned on 1MiB

boundaries. If this option is not selected, the alignment used on the target drive will be determined automatically based on the source drive.

Change Disk ID and GUIDs – This option only applies to full drive copies. It allows you to change the NT Signature restored to the target drive. For target GPT drives, the MBR NT Signature, the GPT Disk GUID, and the partition GUIDs will all be changed. This can be useful if you plan on having both the original and restored hard drive in the same computer at the same time; otherwise Windows may detect the duplicate signature and modify it which may (depending on the OS) prevent the restored hard drive from booting properly.

Remove Gaps on Copy – Select this option to remove any gaps (free space) between partitions. Partitions will be copied adjacent to each other.

First Track Sectors – This text box allows you to specify how many sectors of the first track of the hard drive should be copied. If you enter AUTO in this box, the tracks needed for the EMBR will be copied. If you aren't sure, type AUTO in this box.

Resize After Copy – Currently available only for FAT, FAT32, NTFS, and EXT 2/3/4 partitions, you can use this text box to specify a new size for the copied partition, bound by the **Min**imum and **Max**imum values specified by Image for Windows. The units used here are mebibytes, abbreviated MiB. (Please refer to the section titled **Data Storage Size Unit Conventions** at the beginning of this manual for more information.)

New Name – Enter the new volume name (label) for the copied partition. If left blank the name will not be changed from its copied value.

Save Defaults – Click this button to save the settings you establish. In the future, Image for Windows will display these settings automatically.

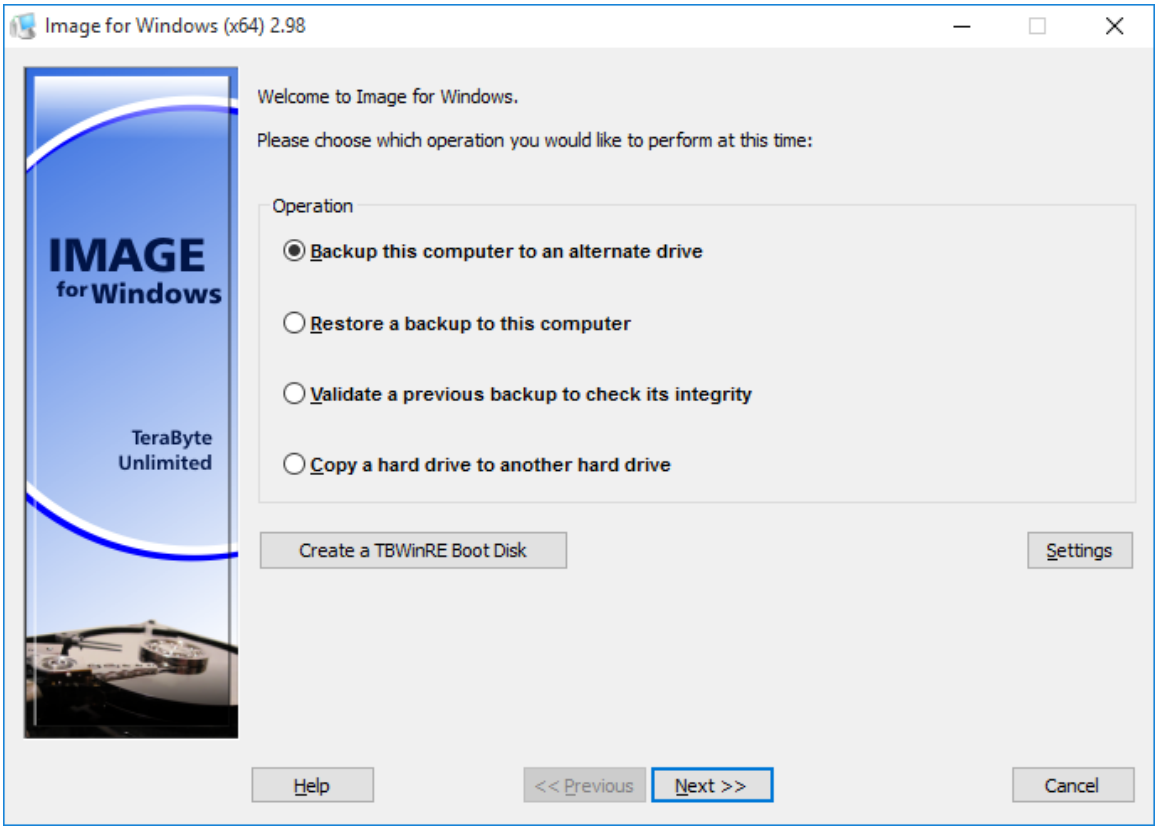
Show Command – Click this button to display the information you would type at a command prompt to start a copy with the options you selected as you displayed the various windows in Image for Windows. You can use this information to create a batch file or TBScript (.TBS) file that runs Image for Windows by selecting the **Save to File** option. The command line can be edited before being saved. For details on using Image for Windows from a command prompt, see the section, "Running Image for Windows from the Command Line" on Page 124.

Using Simple Operations Mode

Simple Operations mode allows Image for Windows to automatically handle most options for you. Backup, Restore, Validate, and Copy operations are available in this mode. To use Simple Operations mode, enable the **Simple Operations** option in Settings.

Backups are saved to a store on the destination drive (e.g. E:\TeraByte_TBI_Backups). The storage area is automatically maintained and files are deleted as needed when it runs out of free space.

You can run TBWinPE/RE Builder to create the TBWinRE boot media by clicking the **Create a TBWinRE Boot Disk** button. The TBWinRE boot media can be used to restore the Windows drive or partition (restoring the Windows partitions while it's running is not possible).

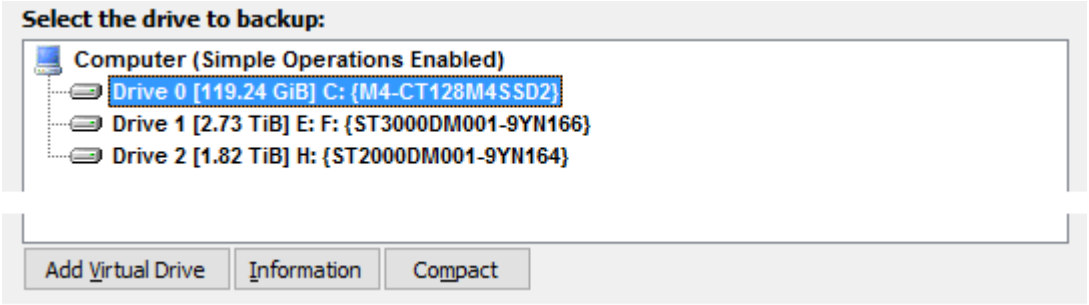


Creating a Backup

To create a backup of a drive you simply choose which physical drive you want to back up and, if needed, which drive you want to save to.

1. Select **Backup this computer to an alternate drive** on the main window and click Next.

2. Select the drive you wish to back up and then click Next.

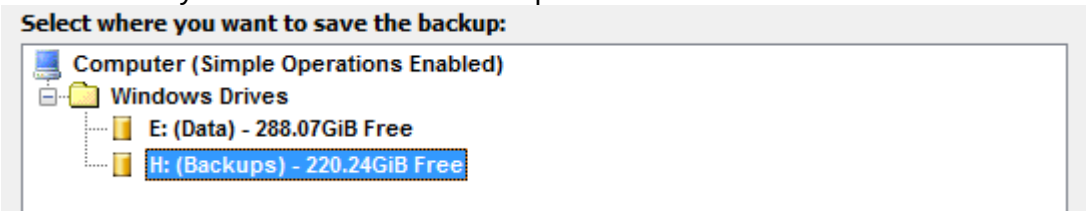

Select the drive to backup:
Computer (Simple Operations Enabled)
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
Drive 1 [2.73 TiB] E: F: {ST3000DM001-9YN166}
Drive 2 [1.82 TiB] H: {ST2000DM001-9YN164}
Add Virtual Drive
Information
Compact

Note: If using Image for Windows outside of Windows (e.g. TBWinRE,

TBWinPE), the drive letters shown are as assigned by the first Windows installation found on the system.

Click the **Compact** button to compact FAT/FAT32 and NTFS partitions on the drive. This option allows you to reduce the size required for a restore. You will be prompted to confirm the compaction and then asked for the compaction value (size in MiB). For example, if you have a 480GB drive that contains 50GB of data and requires 150GB of space to restore and you need to restore it to a 128GB drive, you can compact the drive to under 128GB before imaging it and then restore it to the 128GB drive.

3. Select where you want to save the backup and then click Next.


Select where you want to save the backup:
Computer (Simple Operations Enabled)
Windows Drives
E: (Data) - 288.07GiB Free
H: (Backups) - 220.24GiB Free

Note: If a store already exists for the drive being backed up you will not be prompted to select one (the existing store will be used).

Note: When using Image for Windows in TBWinRE or TBWinPE, accessible partitions not assigned a drive letter will also be available for selection.

4. The summary screen is shown. Click **Start** to create the backup.

Alternatively, if there are no scheduled backups, you can click the **Schedule Backup** button to schedule the current backup. By default, it's scheduled to run at 1AM daily. Refer to *Appendix D: Scheduling Backups* on page 205 for details.

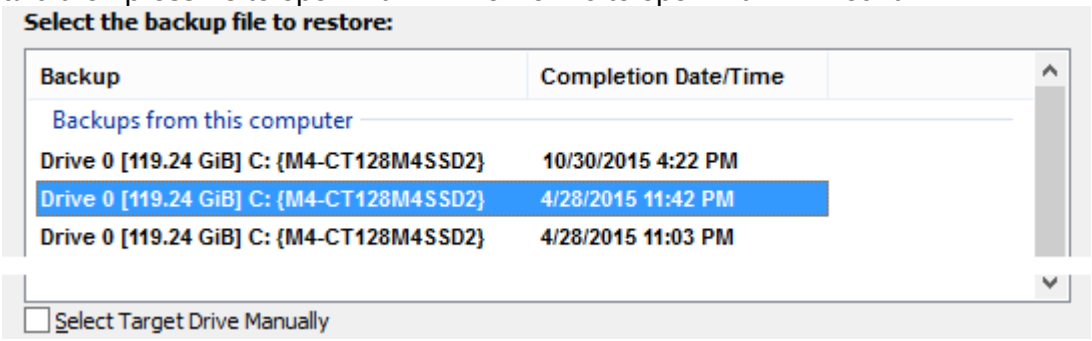
Restoring a Backup

1. Select **Restore a backup to this computer** on the main window and click Next.

2. Select the backup you wish to restore and then click Next. Keep in mind that you can't restore the current Windows drive while Windows is running (you'll need to use the boot media to perform the restore).

While on this screen you can select to view or mount a backup using TBIView or TBIMount. If using a mouse, right-click the backup and then select the desired action from the pop-up menu. If using the keyboard, select the desired backup

and then press F5 to open with TBIView or F9 to open with TBIMount.


Select the backup file to restore:
Backup
Completion Date/Time
Backups from this computer
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
10/30/2015 4:22 PM
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
4/28/2015 11:42 PM
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
4/28/2015 11:03 PM
Select Target Drive Manually

Check the **Select Target Drive Manually** option if you wish to select the drive yourself instead of having the original drive automatically selected. You will be prompted to make your selection in the next step.

3. If existing partitions will be replaced by the restore a warning will appear showing the drive and partitions affected. Click **Yes** to continue if everything looks correct.

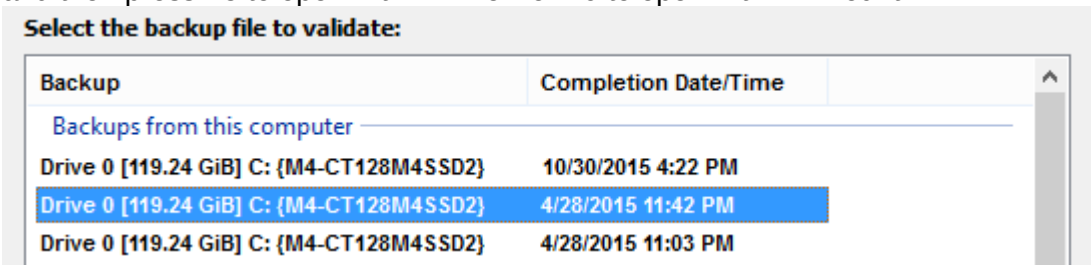
4. The summary screen is shown. Click **Start** to run the restore.

Validating a Backup

1. Select **Validate a previous backup to check its integrity** on the main window and click Next.

2. Select the backup you wish to validate and then click Next.

   While on this screen you can select to view or mount a backup using TBIView or TBIMount. If using a mouse, right-click the backup and then select the desired action from the pop-up menu. If using the keyboard, select the desired backup and then press F5 to open with TBIView or F9 to open with TBIMount.

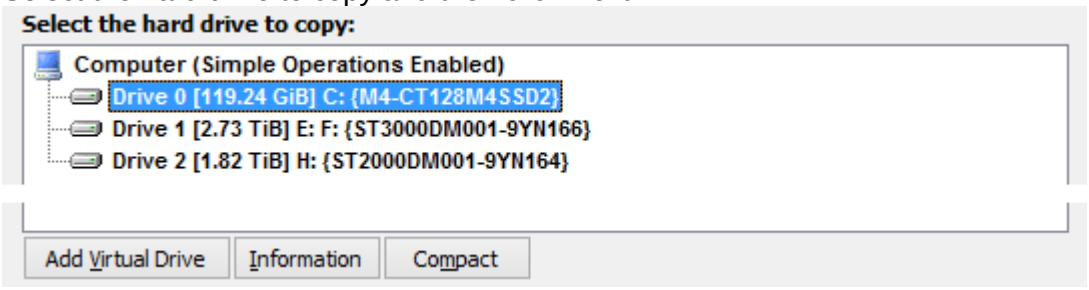

Select the backup file to validate:
Backup
Completion Date/Time
Backups from this computer
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
10/30/2015 4:22 PM
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
4/28/2015 11:42 PM
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
4/28/2015 11:03 PM

3. The summary screen is shown. Click **Start** to run the validation.

Copy a Hard Drive

1. Select **Copy a hard drive to another hard drive** on the main window and click Next.

2. Select the hard drive to copy and then click Next.


Select the hard drive to copy:
Computer (Simple Operations Enabled)
Drive 0 [119.24 GiB] C: {M4-CT128M4SSD2}
Drive 1 [2.73 TiB] E: F: {ST3000DM001-9YN166}
Drive 2 [1.82 TiB] H: {ST2000DM001-9YN164}
Add Virtual Drive
Information
Compact

   Click the **Compact** button to compact FAT/FAT32 and NTFS partitions on the drive. This option allows you to reduce the size required for a restore. You will be prompted to confirm the compaction and then asked for the compaction value (size in MiB). For example, if you have a 480GB drive that contains 50GB of data and requires 150GB of space to restore and you need to restore it to a 128GB drive, you can compact the drive to under 128GB before imaging it and then restore it to the 128GB drive.

3. Select the drive you want to copy to and click Next.

4. If the selected destination drive is not large enough, but the source data can be compacted to fit, a warning will appear. Click **Yes** to continue and compact the source data or **No** to select a different drive.

5. If the selected destination drive has existing partitions a warning will appear showing the drive and the partitions that will be deleted. Click **Yes** to continue if everything looks correct.

6. The summary screen is shown. Click **Start** to copy the drive.

Deploying Your Image

When you *deploy* an image, you restore it to a number of computers in an organization. Therefore, the information in this section does not apply to most home users.

Image for Windows does not change the SID of Windows NT/2000/XP/2003, Vista, or Windows 7 systems. If you are using Image for Windows for deployment purposes and want to change the SID for Windows you should use the MS sysprep utility or you can download a free utility named NewSID.

You may want to set up the base machine so that the last partition ends at one track less than the actual end of the hard drive (around 8 MB less) to leave room for different brands or models of the same size hard drive.

You might also want to read the following information stored on the Terabyte website:

http://www.terabyteunlimited.com/kb/article.php?id=033

See the following for more information on how to prepare for deployment for Windows XP:

How to Use the Sysprep Tool to Automate Successful Deployment of Windows XP

http://support.microsoft.com/kb/302577

Windows XP How-to and Technical Article Resources

http://technet.microsoft.com/en-us/library/bb878149.aspx

Download for the Microsoft Windows XP SP1 Deployment Tools

http://www.microsoft.com/downloads/details.aspx?familyid=7A83123D-507B-4095-9D9D-0A195F7B5F69&displaylang=en

Download for the Microsoft Windows XP SP2 Deployment Tools

http://www.microsoft.com/downloads/info.aspx?na=47&p=1&SrcDisplayLang=en&SrcCategoryId=&SrcFamilyId=0c4bfb06-2824-4d2b-abc1-0e2223133afb&u=details.aspx%3ffamilyid%3d3E90DC91-AC56-4665-949B-BEDA3080E0F6%26displaylang%3den

See the following for more information on how to prepare for deployment for Windows Vista:

http://technet2.microsoft.com/WindowsVista/en/library/2957d7c4-02c7-4205-afb5-f03434d8f37d1033.mspx?mfr=true

See the following for an overview of Windows 7 Desktop Deployment:

http://technet.microsoft.com/en-us/library/dd939988(WS.10).aspx

See the following for more information on how to prepare for deployment for Windows 2003 Server:

What is Sysprep?

http://technet2.microsoft.com/windowsserver/en/library/c03a5469-ef71-4545-b970-ce2add5e715c1033.mspx?mfr=true

Download for the Microsoft Windows 2003 Server Sysprep Tool:

http://www.microsoft.com/downloads/details.aspx?familyid=93F20BB1-97AA-4356-8B43-9584B7E72556&displaylang=en

See the following for more information on how to prepare for deployment for Windows 2000:

Download for the Microsoft Windows 2000 Sysprep Tool:

http://www.microsoft.com/downloads/details.aspx?familyid=0C4BFB06-2824-4D2B-ABC1-0E2223133AFB&displaylang=en

Using Sysprep to Duplicate Disks

http://www.microsoft.com/technet/prodtechnol/windows2000serv/reskit/deploy/dgcb_ins_izyl.mspx?mfr=true

See the following for more information on how to prepare for deployment for Windows NT:

Windows NT Workstation Deployment

http://www.microsoft.com/technet/archive/ntwrkstn/deploy/depopt/default.mspx?mfr=true

Image for Windows Advanced Configuration Options

Image for Windows offers a number of advanced configuration options. You can set these options in a user-created IFW.INI file or using environment variables that you include on the command line or in a batch file. You also can create a services.ins file to control Windows services while working in Image for Windows.

The way you run Image for Windows affects the way Image for Windows processes advanced options. If you run Image for Windows using the menu interface as described earlier in this manual, Image for Windows sets all options using IFW.INI, and you can customize IFW.INI. If you also want to set environment variables, store them in a batch file that you run prior to running Image for Windows.

If you run Image for Windows from the command line as described in the section, "Running Image for Windows from the Command Line," Image for Windows processes the command line switches and uses IFW.INI to process global default options (but ignores all other options in IFW.INI) and finally processes any environment variables you set. So, environment variables take precedence over IFW.INI. The services.ins file functions independently and Image for Windows will process it if it exists unless you include a switch to ignore services.ins.

Image for Windows INI File

To apply settings to Image for Windows, you create a text file named IFW.INI using a text editor such as Notepad. The default location for this file is the Image for Windows program folder. For more advanced users, please note that Image for Windows will search for this file in the following locations until found: the current path, the system path, the program folder.

Settings you specify in IFW.INI need to be placed under a section name. For details on the settings available, refer to Tables 1 to 11 in the section, "Running Image for Windows from the Command Line." A typical backup IFW.INI file might look like this:

```
[Options]
SeqVolID=1
TimeZone=PST8PDT

[BACKUP_DEFAULTS]
PostValidate=2

[HD0]
UseOrgGeo=1
```

Tip: If you are manually using BartPE/WinPE and the Image for Windows plug-in, you can use the [License] section of the imagew.ini file to automate entering your Image for Windows product key using the format shown below. Use the "PE Builder Plugin Installer" included with Image for Windows, to have this information entered automatically.

```
[License]
key=username licensenumber
```

Image for Windows Environment Variables

You use the SET command to establish Image for Windows environment variables. The format for Image for Windows environment variables is:

SET IFW=option1:value;option2:value;option3:value

You set all of the environment variables you can use with Image for Windows by using the same options as you would use from the command line (not the INI options). The command line options appear in the left column of Tables 1 to 11.

You can display a list of currently set environment variables from the command line by typing the `set` command with no parameters. To remove an environment variable, type the `set` command, the variable name, and an equal sign (=) followed by no value. For example, to clear the IFW variable, type the following:

SET IFW=

Image for Windows File Path Variables

You use a set of special variables in the image file name path. The variables are inserted in the file name path by using a special format of $~variablename$. The available variable names are:

YYYY (four digit year), YY (two digit year), MM (two digit month), DD (two digit day of month), DOY (three digit day of year), DOW (three character day of week), HHMM (four digit hours and minutes), HHMMSS (six digit hours, minutes, and seconds), and VER for the program version, or any variable name created by using the "savename" option..

For Example, the following variables would embed the 4-digit year, 2-digit month, and 2-digit day in the image file name.

"Backup on $~YYYY$-$~MM$-$~DD$"

The "savename" option is useful when scheduling ongoing differential backups that need to reference a full backup that is created using date based names as the example above shows. For example, if you setup the full backup schedule using the option "/savename:lastfullbackup" then you could reference it in the differential as shown below:

"/base:$~lastfullbackup$"

Image for Windows and Windows Services

To control Windows services from within Image for Windows before and after PHYLock starts, set up a file called `services.ins`. Place each service's entry on a separate line and save the file as a comma-separated values (CSV) file. You can set the following parameters in the order listed on each line:

* Service name - the name of service to control

* The action to take before backing up - start/stop/pause/continue/none

* The number of milliseconds to wait before backing up – a value in milliseconds that represents the maximum wait time for action completion

* The action to take after PHYLock starts - start/stop/pause/continue/none

* The number of milliseconds to wait after PHYLock starts - a value in milliseconds that represents the maximum wait time for action completion

* The action to take after completing the backup - start/stop/pause/continue/none

* The number of milliseconds to wait after completing the backup - a value in milliseconds that represents the maximum wait time for action completion

For example, suppose that you create a `services.ins` file that contains the following string:

```
my service,stop,30000,none,,start,10000
```

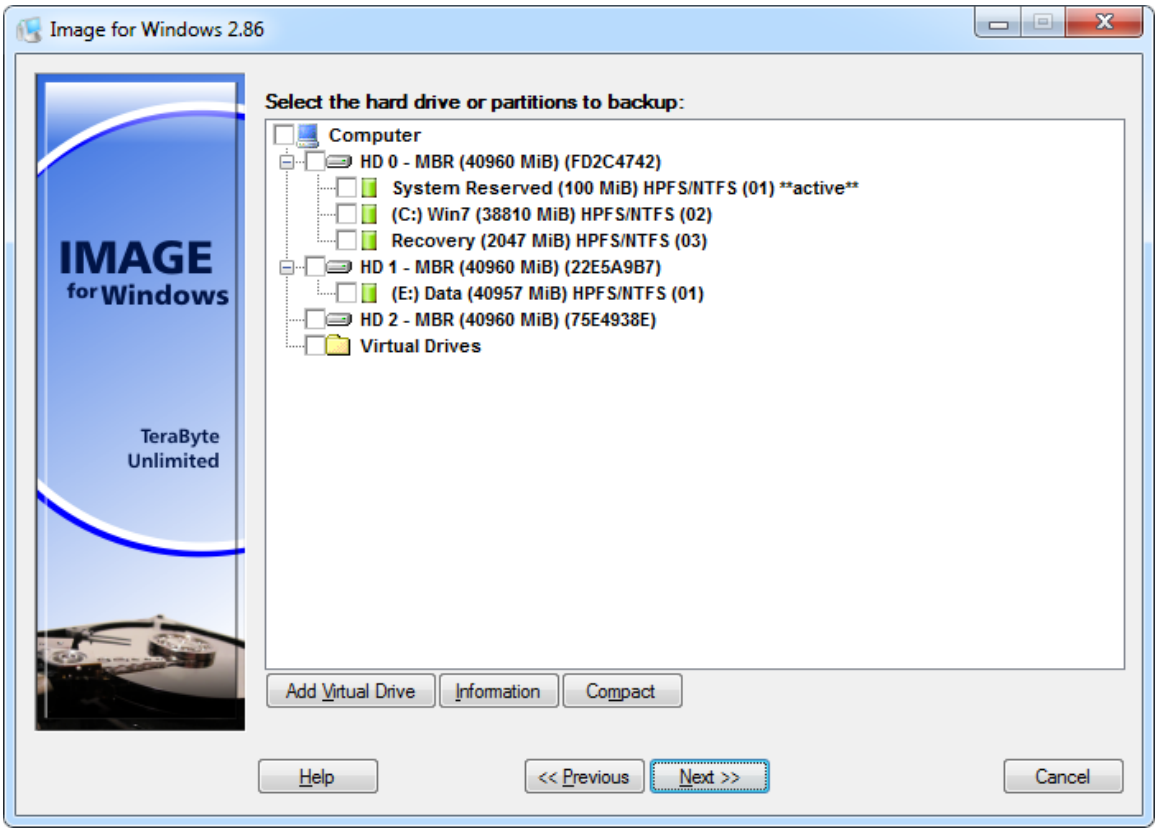
Using this information, Image for Windows will stop the service named "my service" before backing up, waiting up to 30000 milliseconds before backing up. In addition, Image for Windows will take no action after PHYLock starts. After the backup finishes, Image for Windows will restart "my service," waiting a maximum of 10000 milliseconds after completing the backup.

Note: Image for Windows will process `services.ins` if it exists unless you include the /ignsvc switch on the command line or the IgnoreServices parameter in the `IFW.INI` file to ignore `services.ins`.

Running Image for Windows from the Command Line

You can run Image for Windows (`IMAGEW.EXE`) from the command line. Be sure to separate the command line options with spaces or colons (:). When run under Windows Vista or Windows 7, Image for Windows will trigger a UAC prompt if UAC is enabled.

When running Image for Windows from the command line, you might need to include references to hard drive numbers and/or partition IDs. To determine the correct hard drive number or partition ID, complete Steps 1 through 4 in the section "Creating a Full Backup," making sure that you select the hard drive whose number and/or partition IDs you need to obtain. The hard drive number will then appear in the format "HD n" (e.g. "HD 0" or "HD 1"). The partition ID appears in parenthesis at the end of each partition description and consists of either two or four characters. In the figure, the first hard drive, HD 0, has two partitions, and their numbers, 01 and 02, appear in parentheses at the end of each partition's description.



Note: Under certain configurations, hard drive numbers may be different under DOS than they are under Windows or other environments.

The basic format for running Image for Windows from the command line is:

```
imagew [action] [options]
```

Valid values for [action] are:

B	Backup
R	Restore
Copy	Copy
V	Validate
L	List partitions, optical drives, or file contents
Combine	Combine incrementals with the base image
REBOOT	Reboot system

When you specify command line options, you precede each option by typing the / (slash) character.

For example, you might type the following at the command prompt to create a backup using Image for Windows. The command specifies the source drive and partition, the target drive and partition, and the backup filename.

```
imagew /b /d:0@0x01 /f:1@0x01:\mypath\filename
```

The first parameter, /b, identifies that you want to perform a backup.

The second parameter, `/d:0`, identifies the drive to back up. This example backs up Hard Drive 0.

The next part of that parameter, `@0x01,` identifies the partition to back up on the selected hard drive; this example backs up the first partition. If you want to back up the entire drive, simply omit the part of the parameter that identifies the partition.

The third parameter, `/f,` identifies that you are about to specify where to store the backup file. `1` identifies the target drive and `@0x01` again identifies the partition; in this example, Image for Windows will store the backup file on Hard Drive 1 in the partition with ID 0x01. The information after `@0x01` represents the path and file name where you want to store the backup file. In this example, Image for Windows stores the backup file in `\mypath\filename`.

To list partitions on a hard drive, you would type:

```
imagew /l /d:0 > filename.txt
```

In this example, /d:0 identifies hard drive 0 as the drive for which you want to list partitions and > filename.txt indicates the file where Image for Windows will write the list of partitions.

In Table 1, you find the global parameters you can set for Image for Windows regardless of the action you set (backup, restore, validate, or copy).

Important Note: It's highly recommended that all global and device options be set before any other options. This is because certain command line options use whatever global/device option is set at the time the parameter is handled.

Example using the **/ue** global option and **/a2k** device option when restoring:
`imagew /ue /a2k /r /d:w0 /f:mybackup`

The table shows you both the command line option and the INI file variable. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Options] section except as otherwise noted.

Table 1: Image for Windows Global Parameters

Command Line Option	INI Variable
/uvl:0	VolumeLabels=0
Instructs Image for Windows to display the string found in the partition table of the EMBR, if possible, rather than volume labels. *Default if omitted:* Image for Windows will display volume labels, even if identifiers for applicable partitions exist in the EMBR.	
/seq	SeqVolID=1
Instructs Image for Windows to assign ID numbers to volumes in sequential order rather than random order. *Default if omitted*: Image for Windows will assign ID numbers to the volumes in random order.	
/cb:n	CheckBoxes=n
Determines if check boxes are used for partition selection. 0 = No, only a drive or single partition can be selected. 1 = Use individual checkboxes. Each partition has its own selection. 2 = Use linked checkboxes. Each partition has its own selection, but they are linked and selection of an extended partition only selects the individual volumes. *Default if omitted*: Image for Windows uses linked checkboxes.	
/acc	Accessible=1
Changes the checklist boxes to be compatible with screen readers. 0 = Normal check boxes 1 = Screen reader accessible check boxes *Default if omitted*: Image for Windows uses normal check boxes.	
/shownet:n	ShowNetwork=n
Determines if the Entire Network option is available in the file location tree dialog box. You'd use this option to disable the Entire Network option if searching the network for	

servers and shares takes too much time.

0 = No.

1 = Yes.

Default if omitted: Image for Windows displays the Entire Network option.

/cdbins:n	CDBIns=n

Determines which CD Boot Instruction file to use. 0=Image for DOS (cdboot.ifd), 1=Image for Linux (cdboot.ifl), 2=Custom (CDBOOT.INS).

Default if omitted: Image for DOS option is used.

/nocan	NoCancel=1

Tells Image for Windows not to permit use of the F12 key to cancel the backup, restore, validate, or copy operation once it has begun.

Default if omitted: You can use the F12 key to cancel the current operation.

/w7mbr:0	Win7MBR=0

Windows Vista and later tied the kernel loader to the MBR code such that using previous MBR code may not allow Windows Vista or later to boot on certain machines. By default, Image for Windows uses the code base compatible with Windows Vista or later. The new MBR code will continue to boot older OSes with the exception of some (rare) configurations using Win9x on FAT32.

Specify this option to have Image for Windows use Windows 9x compatible MBR code. Note that the .ini file value is not used on command-line based operations.

Default if omitted: MBR code compatible with Vista/Windows 7 or later is used.

/v*n*:filename,cr,type,sizeinmb	V*n*=filename,cr,type,sizeinmb

Makes a virtual drive available for use by Image for Windows. *n* is a number between 0 and 9 you use to represent any of 10 virtual drives. If you reuse a number, Image for Windows will replace the prior definition for that virtual drive.

You must define the virtual device before using it with other command line parameters using one of two formats:

a) Just include the filename of an existing virtual drive.
Example: `/v0:"D:\VHD Files\myvirtualdisk.vhd"`

b) Provide additional parameters after the filename using commas as shown in the sample above and the following example:
`/v2:myvirtualdisk.vmdk,r,vmdks,2048`

For the **cr** parameter, use the letter C or the letter R:

C Tells Image for Windows to create a new virtual drive if one doesn't exist.

R Tells Image for Windows to recreate the virtual drive even if one already exists. Note that Image for Windows gives no warning before recreating a virtual drive.

For the **type** parameter, the following values are supported:

raw	A plain raw file that is allocated as the virtual drive
vhdd	VirtualPC Dynamic Expanding file
vhdf	VirtualPC Fixed file
vhdxd	Hyper-V Virtual Hard Disk Dynamic Expanding file*
vhdxf	Hyper-V Virtual Hard Disk Fixed file*
vhdxd4	Hyper-V Virtual Hard Disk Dynamic Expanding file with a sector size of 4KiB (4096 bytes)*
vhdxf4	Hyper-V Virtual Hard Disk Fixed file with a sector size of 4KiB (4096 bytes)*
vmdk	VMWare Monolithic Sparse IDE file
vmdks	VMWare Monolithic Sparse SCSI file

*For Windows caching reasons, it is highly recommended to create partitions within a VHDX file that are aligned on at least a 1MiB boundary. That is either 2048 sectors for 512 byte sized sectors or 256 sectors for 4096 byte sized sectors.

You can use a special form of the command line parameter (`/v0:`) to remove all references to any defined virtual drives. This special format is useful when you want to override any V*n*= references that may exist in an .INI file.

Default if omitted: No virtual drives are defined.

/kfb	KeepFailedBackups=1

Prevents Image for Windows from deleting the backup created when the backup operation fails.

Default if omitted: The backup created is deleted if the backup failed.

/recover	

Attempts to access image files that are reported as incomplete and suppresses the data loss message/clearing of boot sector data on a failed validation during restore. If you obtain an image stream corrupt message using this option the restored file system should not be trusted. You should attempt to obtain the files you need (which may not be valid) then reformat the partition or restore a good image.

Default if omitted: An incomplete image is reported when opened and boot sector data is not updated or cleared on a restore that fails.

/logfile:"x:\path to\logfile.txt"	LogFile="x:\path to\logfile.txt"

Use this parameter to specify the path and filename of the log file. *x* is a drive letter, *path* is the desired path, *logfile* (or *log file*) is the name of the log file, and *txt* is the file extension of the log file name. Image for Windows doesn't automatically add a file extension. If you use paths and/or filenames with imbedded spaces, enclose them in quotation marks.

The folder you specify for the log file must exist prior to performing an applicable operation in Image for Windows. If the path does not exist, Image for Windows will not

create the specified log file.

Default if omitted: If logging has not been disabled with **/log:0**, a log named `IFW.LOG` is created in the current directory of the operating environment.

/logmax:n	LogMaxSize=n

Ensures the log file doesn't grow beyond the size *n* given. Once *n* is reached the data from the top of the file is purged. Because of this, you typically don't want a large *n* value. *n* can be bytes, KiB, or MiB. Decimal values (e.g. 2.5MiB) are supported.

For example: `/logmax:32768` or `/logmax:32KiB`

Note: If you specify a size smaller than the current log file size, the new size will not take effect until the log is written to or Image for Windows is closed.

Default if omitted: There is a 1MiB size limit on the log file.

/logl:n	LogLevel=n

Causes less or more information to be output to the log file. Use level 1 for errors only, 2 for warnings, 3 for status, 4 for information, 9 for debugging, 10 for debugging with flush.

For example, use `/logl:3` to specify status level logging.

If using 10 or higher, the `/email` option will be ignored (emails will not be sent) unless logging is disabled for the operation.

Default if omitted: Informational level logging is performed.

/ctf	CreateTagFiles=1

Use this option to cause a file named #TBTAG# in the root of any copied or restored partition with information about what program was used and when it was restored or copied. Note that if this option was enabled during a restore or copy then later backed up and restored with tagging disabled, the old tag file remains on the partition. In other words, with this option off, it doesn't delete tag files on restored or copied partitions.

Default if omitted: No tag file is created.

/of:8	OFlags=8

Setting this bit oriented option to 8 will cause single partition and multiple partition backups created to have the "restore first track" and "write standard mbr code" options restricted upon restoring with version 2.62 or later. This is not an option for normal use.

Default if omitted: No restrictions are set.

/evlogl:*n*	EventLogLevel=*n*

This option affects how Image for Windows writes to the Windows event log during backup, restore, validation, and copy operations. Use one of the following values in place of *n*:

0 – Disable all event logging
1 – Log errors only
2 – Log errors and warnings

3 – Log errors, warnings, and start/stop status
4 – Log errors, warnings, start/stop status, and information

The Windows Event Viewer can be used to access the Image for Windows event log entries (located in *Windows Logs* | *Application*). The following events and categories are logged:

Event ID: 257 (Information), 258 (Warning), 259 (Error)

Task Category: None (0), Backup (1), Restore (2), Validate (3), Licensing (4), Copy (5)

Default if omitted: Image for Windows will log errors, warnings, and start/stop status to the event log (equivalent to **/evlogl:3**).

/relax:*n*	RelaxedMatching=*n*

Use this option when performing a differential or incremental backup to instruct Image for Windows to relax some of the criteria it uses to determine the drive you used as the source during the corresponding full backup. This option has no effect during full backup operations. Use one of the following values in place of *n*:

1 – Enable relaxed criteria. Disk signature must match.
2 – Enable relaxed criteria and also ignore the disk signature.

Note: Specifying */relax* is equivalent to */relax:1*

Default if omitted: Image for Windows does not relax the criteria it uses to detect the full backup source drive.

/quit	N/A

Use this option to cancel any operation before it occurs. Anything prior to the operation beginning still occurs. This is useful for processing a global command line option without bringing up the user interface. Image for Windows will return 1 if no error. Otherwise, an error code for the failure will be returned (e.g. **/quit** is used with **/login** and the log-in fails).

Default if omitted: The operation is not canceled.

/savename:varname	N/A

This option is used to save the main file name used on a successful backup, restore or validate operation to the registry. You can then use the varname given on this option as a file path variable on the same computer. See "Image for Windows File Path Variables" section for an example.

Default if omitted: No filename is saved to the registry.

/email:smtphost*from*to*subject*p*u*pw	Email=smtphost*from*to*subject*p*u*pw

Use this option to have Image for Windows email the results of an operation. This causes the email to be sent even if `/log:0` is used. However, if an operation never starts (including a `/login` failure) an email is not sent. The **p**, **u**, and **pw** values are optional and relate to the port, user, and password that should be used. Port 25 is the default SMTP port.

If the **subject** is omitted, Image for Windows determines the text for the subject. The

subject can be customized for success, failure, or both by inserting the][characters (brackets) into the subject. The text before][is the success text; the text after is for a failure. Additionally, you can include the place holder ~ec~, which is replaced by the error code (otherwise, Image for Windows appends the completion code text to the subject).

You can also specify a stored password (configure in Settings or with the **/login:** option) by using the following format (where *name* is the stored password name for the login):

{#*name*#}

If SSL is required, please see the KB article Sending Emails from Image for Windows to Servers that Require SSL for details.

Examples (each example should be on one line):

Using default subject text:

```
/email:"smtp.mydomain.com*from@mydomain.com*to@mydomain.com*][*25*
login@mydomain.com*password"
```

Using custom failure subject text:

```
/email:"smtp.mydomain.com*from@mydomain.com*to@mydomain.com*][IFW
Backup Failed (Error ~ec~)*25*login@mydomain.com*password"
```

Using custom success/failure subject text, default port, and a stored password:

```
/email:"smtp.mydomain.com*from@mydomain.com*to@mydomain.com*IFW Backup
Completed][IFW Backup Failed (Error ~ec~)**login@mydomain.com*
{#loginname#}"
```

Using the default/custom subject text (as used by version 2.71 and earlier):

```
/email:"smtp.mydomain.com*from@mydomain.com*to@mydomain.com**25*
login@mydomain.com*password"
```

```
/email:"smtp.mydomain.com*from@mydomain.com*to@mydomain.com*IFW
Operation Result ~ec~*25*login@mydomain.com*password"
```

Note: Emails will not be sent if using Log Level 10 (`/logl:10`) or higher unless logging is disabled.

Default if omitted: No email is sent.

/po:n	PerfOpt=n

This option is used to manually control various file caching options of Image for Windows and Windows itself. The settings can have an impact on the overall performance and can be used to fix some driver-based problems as well. The values for n can be as follows and combined using addition:

0	Disable default cache settings used by Image for Windows
1	Disable Windows cache on writes
2	Disable Windows cache on reads
16	Disable write cache on removable drives (only applies if 257 not used)
32	Use smallest alignment (applies to 2.59 or later)
64	Image for Windows will determine if write cache is disabled on

	removable drives (only applies if 257 not used)
257	Use Windows cache on writes
514	Use Windows cache on reads
1028	Use small write cache on backup
2056	Use small write cache on restore

For example, users saving to an iPod may get an error "Unable to write data to file". This can be fixed by using the /po:0 option (disabling the default option 64). Network users may find some combination of values work better than what Image for Windows determines to use itself.

Default if omitted: Image for Windows determines if it should disable the write cache on removable drives (64) and uses the other values as it sees fit.

/min	N/A

Use this option to have Image for Windows minimize itself.

Default if omitted: Image for Windows does not automatically minimize itself.

/hide	N/A

Use this option to have Image for Windows hide the user interface. Note: This option applies only to the GUI version of Image for Windows.

Default if omitted: Image for Windows will display the GUI.

/wait	N/A

Use this option to have Image for Windows wait for another instance of the program to finish and then proceed with the specified operation. When used, this option **must** be the first parameter. This option is automatically used when Image for Windows creates a scheduled task.

Default if omitted: If another instance of the program is running, Image for Windows will ignore the specified operation and switch to the running program.

/nowait	N/A

This option allows running multiple instances of Image for Windows. This option will also disable usage of PHYLock and VSS. When used, this option **must** be the first parameter.

Default if omitted: If another instance of the program is running, Image for Windows will ignore the specified operation and switch to the running program.

/priority:n	Priority=n

Use this option to have Image for Windows adjust its CPU priority when an operation begins. The available options for n are: 0=Low, 1=Below Normal, 2=Normal, 3=Above Normal, 4=High.

In addition, you can enable background mode by adding 8 to the previous values, for example, 10=Normal CPU run in background mode. However, running in background mode is VERY slow. For example, something that normally takes 30 seconds may take 10 minutes when Image for Windows is running in background mode. If background mode is enabled you will not be able to change the priority during an Image for Windows operation.

Default if omitted: Image for Windows does not change the priority.

/dpc	DisablePriorityChanges=1

Use this option to lock the CPU priority of Image for Windows so it can't be adjusted while the operation is in progress.

Default if omitted: Image for Windows allows priority changes.

/iop:n	IOPriority=n

Use this option to have Image for Windows adjust the priority of the image file itself. The available options for n are: 0=Very Low (idle), 1=Low, 2=Normal.

Lowering the priority may allow the system to respond more quickly when running operations on a live system. However, it may also cause the Image for Windows operation to slow down substantially.

Default if omitted: Image for Windows uses Normal priority for the image file.

/dpwr	DisablePowerChanges=1

Use this option to lock the power options of Image for Windows so they can't be adjusted while the operation is in progress.

Default if omitted: Image for Windows allows power option changes.

/login:\\server\share*user*password	LogIn=\\server\share*user*password

Use this option to have Image for Windows attempt to automatically login to a share on a server. This would typically be needed when Windows cannot automatically login to the share for the user profile running Image for Windows.

Image for Windows also allows you to store an encrypted password to the registry so a clear-text password is not needed. When doing this it's important to use the same user profile that will attempt to login when running Image for Windows because it can only be decrypted by the user that created it. Additionally, a password stored using the 64-bit version of Image for Windows may not be available to the 32-bit version or vice versa (see **/altregview** for details). You can also create and manage stored passwords using the Password tab in Settings.

Examples:

Store an encrypted password to the registry: `/login:*ntdomain\user*password`
Delete a stored encrypted password: `/login:*ntdomain\user`
Login using encrypted password: `/login:\\server\share*ntdomain\user`
Login using text password: `/login:\\server\share*ntdomain\user*password`

Tip: When storing a password you may want to use `/log:0` to ensure it's not logged to

ifw.log and `/quit` if you don't need the user interface.

Default if omitted: Image for Windows does not attempt to manually login to a share.

/plur	PHYLockUseReg=1

Use this option to obtain PHYLock settings from the registry instead of using those stored in the `ifw.ini` file and/or set using environment variables. This option is enabled by default.

Note: PHYLock settings in the registry may be stored separately for the 32-bit and 64-bit versions of Image for Windows (see **/altregview** for details). For example, to change a PHYLock setting in both versions you may need to run each version and make the setting change.

Default if omitted: PHYLock uses INI and/or environment variables.

/altregview:*n*	N/A

Use this option to specify the registry location to use for program settings in 64-bit versions of Windows. This option has no effect when used on 32-bit versions of Windows.

By default, certain program settings (e.g. PHYLock, Passwords, ExternVars) are saved in the section of the registry that corresponds to the version (32-bit or 64-bit) being run (e.g. passwords saved by the 32-bit version of Image for Windows are not accessible by the 64-bit version). Starting with Image for Windows 2.94, clean installations on 64-bit versions of Windows will use the 64-bit registry for settings. Prior installations will continue to use legacy mode unless changed by using this option.

Use one of the following values in place of *n*:

0	Default / legacy mode. Settings saved in the registry are separate for the 32-bit and 64-bit versions of the program.
32	Settings will be migrated* from the 64-bit section of the registry to the 32-bit section. Both versions of the program will access them from the 32-bit section. Requires Image for Windows 2.94 or later.
64	Settings will be migrated* from the 32-bit section of the registry to the 64-bit section. Both versions of the program will access them from the 64-bit section. Requires Image for Windows 2.94 or later.

**When settings are migrated any existing settings in the destination section that match those being moved will be overwritten.*

Typically, this option is only used one time: when Image for Windows is already installed and you want both the 32-bit and 64-bit versions of the program to use the same settings. For example, you have passwords saved for the 32-bit version of Image for Windows and want those passwords accessible by the 64-bit version. You run `imagew /altregview:64` to migrate the settings. From this point on the settings are saved in the 64-bit registry and accessible by both versions of the program.

Default if omitted: Clean installations of Image for Windows 2.94 and later on 64-bit versions of Windows will use the 64-bit registry settings regardless of whether the 32-bit

or 64-bit version of the program is run (option value 64). Otherwise, the 64-bit version of Image for Windows will use the 64-bit registry settings and the 32-bit version will use the 32-bit registry settings.

/ignsvc	IgnoreServices=1

Use this option to tell Image for Windows to ignore the `services.ins` configuration file.

Default if omitted: Image for Windows uses the `services.ins` file if it exists.

/usbign:*n*	USBIgnoreMask=*n*

Use this option to hide certain USB host controllers. For example, if you have a USB keyboard, Image for Windows might disable the keyboard when it takes control of the USB2 host controller. Using this option, you can hide the host controller of that USB keyboard and attach the USB keyboard to a different controller. It usually takes some experimentation to determine which controller to hide, but the two USB ports next to each other are usually controlled by the same host controller. To hide the first USB controller, use /usbign:1, and to hide the second USB controller, use /usbign:2. To hide the third USB controller, use /usbign:4. To hide both the first and second USB controllers, use /usbign:3.

Note: Use a basic Bit Mask numbering scheme.

Default if omitted: Image for Windows takes control of all detected USB2 host controllers.

/cbs:0	ClearBootStatus=0

Use this option to prevent Image for Windows from forcing Windows to assume a clean shutdown on Windows 2008 R2/Vista/7. This applies to copy and restore only.

Default if omitted: Windows 2008 R2/Vista/7 boot status is cleared.

/phc:n	PageHiberClear=n

This option is used to control how the default page file (`pagefile.sys`), swap file (`swapfile.sys`), and hibernation file (`hiberfil.sys`) are treated after being restored or copied when they have been omitted from the backup/copy. The values are bit based and can be one of the following values or a combination of the following values added together:

1 – Clear first 4096 bytes of the page file.
2 – Truncate page file to zero.
4 – Clear 8192 bytes of hibernation file.
8 – Truncate hibernation file to zero.
16 – Clear the first 4096 bytes of the swap file.
32 – Truncate swapfile.sys to zero.

For example, to truncate the page file and clear the first 8192 bytes of the hibernation file, use 6.

Default if omitted: The first 4096 bytes of the page file and swap file are cleared and the first 8192 bytes of the hibernation file is cleared.

/fnts:0	ForceNTSig=0

When Image for Windows notifies Windows of changed partitions (see /noosn option) during copy or restore operations, Windows may alter the disk signature if a disk with that signature already exists. This can cause problems that will prevent the target disk from booting Windows properly. To prevent this, Image for Windows forces the disk signature to the restored/copied value even if another disk with the same signature exists. However, if you disconnect and reconnect the disk or add/delete partitions on the disk, Windows will once again alter the disk signature to prevent duplicates.

Setting this option to zero will prevent Image for Windows from ensuring the restored/copied disk signature is retained.

Default if omitted: Image for Windows will ensure the disk signature is set to the restored/copied value even when there are duplicates.

/msg:"*my message"*	Message="*my message*"

This option applies only to the console version of Image for Windows (IMAGEWC.EXE), and not to the standard version (IMAGEW.EXE).

Use this option to specify the text Image for Windows displays while backing up, restoring, validating, or copying. If your message text contains spaces, place the message text in quotation marks:

/msg:*"my message"*

Use ***/*n** to force a new line; otherwise, text wraps to screen width only:

/msg:*"first line\nsecond line"*

Default if omitted: No message text is displayed.

/uggs:0	UseGlobalGeoSettings=0 Place under the [HDx] section

Use this parameter to disable the use of the global geometry settings for this individual drive. This applies to interactive use of global geometry settings.

Default if omitted: Global geometry settings apply to the drive.

/npt	NoPartTable=0x10000 Place under the [HDx] section

Use this parameter to tell Image for Windows to treat the selected drive as a drive that doesn't use a partition table. If you use this option on the command line, you must place it before the /d option. It stays in effect until you disable it using /npt:0. You may want to disable this option if you use additional options to select a device/partition such as the /f:0@0x1:\filename option. Note that the .ini file value is not used on command-line based operations.

Default if omitted: Image for Windows treats the selected drive as a drive that uses a partition table.

/anpt	AssumeNoPartTable=0x40000

	Place under the [HDx] section
Use this parameter to tell Image for Windows to treat the selected drive as a drive that doesn't use a partition table only if the first sector on the drive is all zeros. If you use this option on the command line, you must place it before the device is specified. Note that the .ini file value is not used on command-line based operations. *Default if omitted*: Image for Windows treats the selected drive as a drive that uses a partition table.	

/nptrm	NPTOptRemMedOnly=0x80000 Goes under the [HDx] section
Use this parameter to tell Image for Windows to apply the npt or anpt options on removable media only. If you use this option on the command line, you must place it before the device is specified. Note that the .ini file value is not used on command-line based operations. *Default if omitted*: Image for Windows applies the npt or anpt option to all drives..	

/geodis	GlobalGeoDisable=1
Use this to disable the global geometry settings and revert to using program defaults or drive specific overrides equivalent to versions prior to 2.52. This option only applies to interactive sessions; it does not apply to command line restores. *Default if omitted*: Global geometry options are not disabled.	

/geoah	GlobalGeoAlignHS=1
When this option is enabled Image for Windows will prevent problems with unaligned partitions being restored to systems with BIOS Auto Mode enabled. Many newer systems use auto mode by default, and some even don't have an option to turn it off. This is equivalent to enabling the individual overrides *Align MBR Ending HS* and *Align MBR HS when Truncated*. This option only applies to interactive sessions; it does not apply to command line restores. To disable use /geoah:0 *Default if omitted*: This option is enabled.	

/geoa2k	GlobalGeoAlign2K=1
This option provides a convenient way to enable 1MiB partition alignment for all drives (drives with 512 byte sectors will be aligned on 2048 sectors; drives with 4096 byte sectors will be aligned on 256 sectors). This is popular with users of SSD type drives. It is the equivalent to enabling the individual overrides *Align on 1MiB Boundaries, Align MBR Ending HS, Align MBR HS when Truncated*, and disabling *Align on End*. This option only applies to interactive sessions; it does not apply to command line restores. *Default if omitted*: This option is disabled.	

/geoav:*n*	GlobalGeoAlignVal=*n*
This option allows you to specify a custom partition alignment value for all drives. For example, to align partitions on 2MiB boundaries, use /geoav:2M or GlobalGeoAlignVal=2M. Invalid sizes will be ignored. This option overrides the other	

interactive alignment options. This option only applies to interactive sessions; it does not apply to command line restores.

Default if omitted: This option is not set (a custom alignment value will not be used).

/geombr	GlobalGeoMBRGeo=1

This option is used to prevent problems where users restore an image from another system to a drive that will be put back in the other system. For example, the hard drive from PC-A is backed up; PC-B is used to restore to a new hard; that new drive is placed back in PC-A. Without this option enabled, Image for Windows would setup the partition to properly boot on the hard drive for PC-B which can sometimes (not always) be a problem when the hard drive is going back to PC-A. This option solves that and is equivalent to the individual *Use MBR Geometry* override. This option only applies to interactive sessions; it does not apply to command line restores.

Default if omitted: This option is Disabled.

/geombrv	GlobalGeoMBRGeoValidate=1

This option is used to ensure that the geometry from the MBR on the original system is aligned to known standards before accepting it for use. It only applies when /gemombr (GlobalGeoMBRGeo) is enabled. This option only applies to interactive sessions; it does not apply to command line restores. To disable use /geombrv:0

Default if omitted: This option is enabled.

/geoorg	GlobalGeoOrgGeo=1

This option is the global equivalent to the individual *Use Original Geometry* override. This option only applies to interactive sessions; it does not apply to command line restores.

Default if omitted: This option is disabled.

/nos:size	NoScale=size

This option offers a way to prevent scaling of small partitions when scaling to a larger drive. Partitions that are size (in bytes) or smaller will not be scaled. For example: 200m would not scale partitions that are 200MiB or smaller. Note that the .ini file value is not used on command-line based operations.

Default if omitted: All partitions are scaled when scaling is used.

/ue	N/A

This option instructs Image for Windows to pull both global and operation options from the IFW environment variable. You must specify this option before the operation parameter on the command line. For example, if creating a backup: `imagew /ue /b …`

Default if omitted: Image for Windows will only pull global options from the IFW environment variable.

/u	N/A

Use this option to cause Image for Windows to not display the completion message on success of the operation. A message will still be displayed if success with bad sectors or an error occurred. This allows the rest of the user interactive prompts to continue to work normally whereas with **/uy** or **/un** they would be auto-answered.

Default if omitted: The completion message will be displayed on success.

/un	N/A

Use this parameter to perform an unattended backup and tell Image for Windows to assume the answer to all Yes/No prompts is No, the answer to all OK/Cancel messages is Cancel, and the answer to all Abort/Retry/Ignore prompts is Abort. Image for Windows then terminates the backup process when the first Yes/No prompt appears.

This option should be placed just after the action parameter (/b /r /v) to ensure this parameter is in effect for prompts that may occur in other command line options.

If desired, you may override the effect of **un** for Abort/Retry/Ignore prompts by also supplying the **ui** parameter. See the description of the **ui** parameter below for more information.

This option is disabled when additional media is needed (file not found) and /um is not specified.

Default if omitted: Image for Windows does not run an unattended backup.

/uy	N/A

Use this parameter to perform an unattended backup and tell Image for Windows to assume the answer to all Yes/No prompts is Yes, the answer to all OK/Cancel messages is OK, and the answer to all Abort/Retry/Ignore prompts is Ignore.

This option should be placed just after the action parameter (/b /r /v) to ensure this parameter is in effect for prompts that may occur in other command line options.

This option is disabled when additional media is needed (file not found) and /um is not specified.

Default if omitted: Image for Windows does not run an unattended backup.

/ui	N/A

Use this parameter when performing an unattended backup to tell Image for Windows to assume the answer to all Abort/Retry/Ignore prompts is Ignore. You can use this parameter alone or in conjunction with **un**. (Using **ui** with **uy** is unnecessary, since **uy** alone causes Ignore to be selected.)

Default if omitted: Image for Windows assumes the answer to all Abort/Retry/Ignore prompts is either Abort or Ignore, depending on whether you set **un** or **uy** (respectively). If **un**, **uy**, and **ui** are all omitted, Image for Windows displays the Abort/Retry/Ignore prompt.

/um	N/A

During an unattended backup using CD/DVD discs, use this parameter to tell Image for Windows to ignore the first request for media. This option helps you start the backup if

you have already inserted a disc and a prompt appears asking for the disc. This option works only for the first prompt—you need to respond to other prompts for media unless you specify /uy or /un. If you combine /uy or /un with this option, then any additional disc requests will cause the program to end with an error instead of prompting for the media.

For media other than CD/DVD discs or during a restore/validation, using this option allows the program to end with an error instead of prompting for the media.

Place this option just after the action parameter (/b /r /v) to ensure this parameter is in effect for prompts that may occur in other command line options.

Default if omitted: Media change requests will disable the /uy or /un options and you will need to respond to the request.

/up	N/A

Use this parameter when performing an unattended backup to tell Image for Windows to not prompt for a password if one is needed and not provided or is provided and is incorrect. Instead, the program will just exit with an error code.

Default if omitted: Image for Windows will prompt for a password if one is needed.

/asr:0	AutoScaleRestrict=0

Use this option to prevent small partitions from being automatically scaled when restoring or copying a full drive. All partitions will be scaled normally (per scaling option selected) to fit the destination drive unless a minimum size is specified using the **/nos** option.

Default if omitted: Partitions with a size of 15GiB or 1/8 the drive size (whichever is less) or smaller will not be scaled when restoring a full drive image or copying a full drive. This provides an automatic method to avoid scaling system reserved, recovery, and utility partitions to larger sizes when upgrading to a larger drive.

/aubp:0	AutoUpdateBootPart=0

Use this option to prevent Image for Windows from automatically updating the boot partition when a full drive image is restored or a drive is copied.

Default if omitted: The boot partition (including an EFI system partition) will automatically be updated when a full drive image is restored or a drive is copied.

/sar:0	SearchOnAutoRestore=0

When performing an automatic restore, limits Image for Windows to using the drive number of the backed up drive to determine the destination drive.

Default if omitted: Image for Windows will search for the destination drive when performing an automatic restore (virtual drives will not be searched). The search includes checking the disk signature or GUID, drive size, and empty drives. If a match isn't found the drive number of the backed up drive will be used.

/odid	OutputDiskID=1

Use this option to enable command line output and relevant log entries to use the Disk ID (NT Signature or GUID) instead of drive numbers where the drive has an ID and the

ID is unique. Specifying the Disk ID instead of the drive number may be more stable (especially for setup of scheduling backups) since Windows may reorder drives at boot.

Examples:
```
imagew /b /d:#0xFD2C4742@0x1 /f:"E:\mybackup"
imagew /b /d:{88AA61DC-7D91-4369-97FF-770EAE169F25}@0x4 …
```

Default if omitted: Drive numbers will be used in command line output.

/ca	CompletionAlarm=1

Use this option to enable an audible alarm upon completion of an operation, errors, or when user interaction is required (insert media, etc.).

Default if omitted: The alarm will not be used.

/cr:0	CacheResize=0

Use this option to disable using a cache to reduce the time required to resize a partition.

Default if omitted: Image for Windows will use a cache to speed up resizing a partition.

/pruo:0	PHYLockRAMUnusedOp=0

Specify to allow VSS or PHYLock Disk Mode to remain enabled when backing up unused sectors.

Default if omitted: Image for Windows disables VSS and PHYLock Disk Mode (forcing PHYLock RAM Mode) when a **Backup Unused Sectors** or **Copy Unused Sectors** operation is being performed. This option does not enable PHYLock if PHYLock is disabled. Forcing RAM mode prevents a cache file from being created on the source partition(s), which may be desirable when backing up or copying unused sectors.

/dwdl:0	DisableWinDL=0

Note: This option applies only when Image for Windows is used outside of Windows (e.g. in TBWinRE or TBWinPE).

Use this option to disable searching for Windows drive letters when using the Simple Operations mode of Image for Windows. Drive letters will not be displayed when selecting a drive.

Default if omitted: Image for Windows will search for the drive letter mapping of the first Windows installation found.

/eoo:0	EjectOpticalOnly=0

Use this option to allow Image for Windows to eject both optical and other removable media (e.g. USB flash drives, ZIP drives, etc.) as required. Note that ejecting USB flash drives may make them unavailable to Windows until disconnected and reconnected. This option applies only when the /noej (NoEject=1) option is not used.

Default if omitted: Image for Windows will eject only optical media as required.

/bold:0	Bold=0

Disables using bold fonts on certain radio buttons, tree views, and list views.

Default if omitted: Bold fonts will be used except under TBWinRE/PE where bold fonts will not be used.

/uwfs:0	UseWindowsFS=0

Disables allowing Image for Windows to back up or copy used areas of certain File Systems supported by Windows but not directly by Image for Windows.

Default if omitted: Allows Image for Windows to back up or copy used areas of certain File Systems supported by Windows but not directly by Image for Windows. While it's able to access only used areas for a smaller and faster backup or copy, it does not allow resizing or file exclusions of those volumes. As of this writing, ReFS is the only file system supported by this option.

/simple	Simple=1

Use this option to enable the Simple Operations mode. Image for Windows will automatically handle most options for you. For example, to back up a drive you simply choose which physical drive you want to back up and, if needed, which drive you want to save to.

Backups are saved to a store on the destination drive (e.g. E:\TeraByte_TBI_Backups). The storage area is maintained automatically with backups being deleted as needed when space runs out.

Only Backup, Restore, and Validate operations are available in this mode. When using the command line only backing up is supported.

To use Simple Operations mode when backing up from the command line, use the **/d** parameter to specify the drive to back up and, optionally, use the **/f** parameter to specify the storage drive path (must be root path). Do not specify a base image or any filenames. To specify the maximum number of incremental backups you want in each chain use the **/mi** parameter.

Once a backup of a drive has been saved to a store it's normally not necessary to specify the store when later backups are run since the existing store will be located automatically.

Note: Specifying unsupported parameters or values will cause Image for Windows to ignore the Simple Operations mode request (Normal mode will be used).

Examples:

```
imagew /b /simple /d:w0 /f:E:\

imagew /b /simple /mi:3 /d:w1 /f:G:\

imagew64 /b /simple /d:1 /f:w3@0x2:\

imagew64 /b /vb /simple /d:0 /mi:10 /f:\\Server\share\
```

Default if omitted: Image for Windows will function in Normal mode.

/mi:*n*	MaxIncrementals=*n*

Use this option to specify the maximum number of incremental backups in each chain when using Simple Operations mode (/simple). When the specified number is reached a

new chain will be started.

Default if omitted: Image for Windows limits each chain to six incremental backups.

/ds	DisableSettings=1

Use this option to disable access to global settings within the program. The Settings button will be removed or the Settings key will be disabled (depending on the interface used).

Default if omitted: Image for Windows will allow normal access to global settings within the program.

/bcl:*n*	BackwardsCompatibleLevel=*n*

Use this option to specify the TBI file version to use when creating a backup using the `/bc` (BackwardsCompatible) option. Valid values are 0 (version 2.50) and 278 – 285 (versions 2.78 through 2.85). Any value lower than 278 is considered 0.

Default if omitted: When `/bc` (BackwardsCompatible) is used, Image for Windows will create the backup using the 2.50 TBI file version.

/iocf:*n*	IOCacheFlags=*n*

Use this option to configure when to use small cache I/O for sector I/O and accessing the main image files. The values are bit based and can be one of the following values or a combination of the following values added together:

0 – Disabled
1 – Read File
2 – Write File
4 – Read Sectors
8 – Write Sectors
16 – Copy Sectors (read/write)

For example, to use a small cache for reading and writing the main image files and reading sectors, use the value 7 (`/iocf:7`).

This option can be useful in cases where Image for Windows is slower than previous versions or there are I/O errors due to too large an I/O request (e.g. buggy hardware). Actual speed differences may be negligible and depend on the system being used. Users accessing RAID 0 or RAID 5 drives may see a benefit from not using the small cache (`/iocf:0`).

Default if omitted: Image for Windows will use 5 (a small cache will be used for reading the main image files and reading sectors).

/dt	DeleteTarget=1

Use this option to have Image for Windows delete the target partition before restoring or copying to it. Depending on the partition being restored or copied to a GPT drive, this may be necessary to allow the operation to complete successfully with byte-for-byte validation. Otherwise, if Windows makes changes to the existing target partition while in the locked state byte-for-byte validation will fail.

Normally an existing partition would be locked and unmounted but remain until the end

of the operation. However, on GPT drives it appears a Windows system process can and sometimes does modify a locked volume for a brief time when the first writes to the locked volume over $Boot begin. It does this by reading blocks of data from the area to be written and writing them out to a VSS cache file on the locked volume then, after the data being copied or restored has been written, overwrites $Boot. (We consider this a Windows bug for the main reason that a locked volume is supposed to be guaranteed exclusive access.)

Default if omitted: Image for Windows will not delete the existing target partition before restoring or copying to it.

/csigut	ChangeSigUseTarget=1

Use this option to retain the existing signature of the target disk when restoring or copying a drive and **/csig** is used. For example, this is useful when scheduling a drive copy where /csig is used and you need to specify the target disk by its signature (drive number not used since it could change).

Default if omitted: When /csig is used the target disk signature will not be retained.

/stdout:*filename*	N/A

Use this option to redirect program output that would normally be displayed in the console to the specified file. For example:

```
imagew /l /d:0 /stdout:output.txt
```

The output from the `/l` operation will be saved to the file output.txt.

Default if omitted: Program output is displayed normally in the console.

/msvr:*server*	MServer=*server*

This option enables a simple network interface allowing Image for Windows to communicate via TCP/IP with the specified server and report its current progress and completion. The *server* can be the server name, an IP address, or *localhost*, depending on the location. The port can be specified using the **/mport** option. Otherwise, the default port 54313 will be used. All communication is plain text with each line terminated by CR/LF. If problems are encountered, the communications will be shut down and attempts to reconnect will be made approximately every 30 seconds. Pending information, except R_AUTO statistics, will be sent upon reconnection.

Using this interface provides an easy method to monitor both local and remote operations. Examples include:

- Consultants monitoring backups for clients
- Enterprise logging/monitoring of backups
- Monitoring using custom interfaces

The following table lists the available commands. Commands are not case sensitive. Each command sent must be terminated with CR/LF.

R_WHO	Reports the program and version (as shown in the title bar) as two lines: `WHO:`

	`Image for Windows 2.75`

R_INFO	Reports the information lines displayed during the operation. The first line is "INFO: *n*" (where *n* is the number of lines to follow). In the example below, the fifth line is blank.
	`INFO: 5`
	`Creating image ...`
	`Processing Item: 1 of 1`
	`Backup: Drive 0 (C:) Win7 Partition (02) 38810 MiB HPFS/NTFS`
	`To: e:\Backups\Win7-2012-09.TBI`
	
	This information is also sent automatically as it's updated during the operation.

R_STATS	Reports the progress and statistics of the current operation. The first line is "STATS: *n*" (where *n* is the number of lines to follow).
	`STATS: 6`
	`6`
	`3`
	`1,483`
	`44,182`
	`0:00:00:54`
	`23 minutes`
	
	The statistics reported (one per line) are the current item progress, overall progress, MiB transferred, MiB remaining, time elapsed, and time remaining.

R_AUTO *n*	Use this command to enable or disable statistics being automatically sent at regular intervals. Specify the number of seconds to enable sending or zero (or omit number) to disable.
	`R_AUTO 20`
	Statistics will be sent every 20 seconds.
	`R_AUTO`
	Automatic sending of statistics will be disabled.

A_CANCEL	Sending this command will cancel the current operation.

When the operation has finished, Image for Windows will report "COMPLETED: *n*" (where *n* is the completion code). For example:

`COMPLETED: 0`

Usage examples:

```
imagew /b /v /d:w0 /f:"e:\MainDrive" /msvr:Office1
imagew /v /f:"g:\backups\data" /msvr:localhost /mport:45332
imagew /b /d:w0@0x1 /f:"i:\systembk" /msvr:192.168.0.154
```

Default if omitted: Image for Windows will not try to connect to a server.

/mport:*n*	MPort=*n*

Use this option to specify the port to use with **/msvr**. For example, to use port 45332:

```
imagew /b /d:w0@0x1 /f:"mybackup" /msvr:MyServer /mport:45332
```

Default if omitted: Port 54313 will be used.

/novss	N/A

Use this option to specify that Image for Windows will not attempt to use VSS even if it's enabled or specified on the command line. This option overrides both **/usevss** and **/vssfso**.

Default if omitted: Image for Windows will attempt using VSS per defaults or if set to do so.

/alm	AutoLoadMedia=1

Use this option to allow Image for Windows to continue automatically after a removable media change (CD/DVD, UFD, etc.). When a media change is required a prompt will be displayed until the new media is detected, at which time the operation will continue (user input is not required). If necessary, the operation can be canceled when the prompt is displayed by using the Cancel button.

Default if omitted: Image for Windows will require user input to continue when it prompts for a media change.

/cdf	CDCloseOptions=1

You can use this option when saving images to disc media (CD/DVD/BD). Forces media to be finalized when closed. No further writing to disc is allowed.

Default if omitted: Image for Windows will not finalize the disc when closed.

/nousbpwrfix	N/A

Use this option to prevent a short delay on Windows 8.0/8.1 systems when Image for Windows is run from the command line (the delay is due to a workaround to fix a Windows USB power bug). It is not recommended to use this option on affected systems if using USB drives as the drives may remain powered off and be unavailable to Image for Windows.

Default if omitted: On Windows 8.0/8.1 systems there will be a short delay when Image for Windows runs an operation from the command line.

/tcpdata:0	TCPData=0

Use this option when multicasting to prevent reading the file headers using TCP.

Default if omitted: TCP will be used to read the file headers.

/vblba	VolBPBLBA=1

Specify this option to use the actual LBA in a volume's BPB instead of the L-LBA (LBA offset from the EBR) of the volume.

Default if omitted: The volume's L-LBA will be used in the volume's BPB.

/usnrf:0	USNRollBackFix=0
Disables any attempt at notifying Windows Active Directory that the system has been restored. *Default if omitted*: Attempts to notify Windows Active Directory that the system has been restored.	

You also can set options to control the behavior of PHYLock; these options are described in Table 2. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [PHYLock_Options] section and, if necessary, disable the PHYLockUseReg option in the [Options] section.

Table 2: PHYLock Parameters

Command Line Option	INI Variable
/pldis	PHYLockDisable=1
Use this option to disable PHYLock completely. *Default if omitted.* Image for Windows uses PHYLock to lock the disk or partition.	

/plifnl	PHYLockIfNoLock=1
Use this option to instruct Image for Windows to use PHYLock if Image for Windows can't obtain a normal lock. *Default if omitted*: Image for Windows will report that it cannot perform the selected operation because it cannot obtain a lock on the selected drive or partition.	

/plrell	PHYLockReleaseLock=1
Use this option to instruct Image for Windows to attempt a normal lock and then use PHYLock, even if the lock was obtained. If Image for Windows obtains a normal lock, the lock is released after enabling PHYLock. *Default if omitted*: Image for Windows uses a normal lock if it can obtain one; if not, Image for Windows uses PHYLock to lock the disk or partition.	

/plvolf	PHYLockVolFlush=1
Use this option to instruct Image for Windows to attempt to flush the disk cache of the source drive before attempting to obtain a normal lock or enabling PHYLock. *Default if omitted*: Image for Windows does not try to flush the disk cache.	

/pldisk	PHYLockUseDisk=1
Use this option to instruct Image for Windows to attempt to use disk-based storage for the PHYLock cache with a size specified by the /**pldcs** parameter. Using a value of 0 will disable this option (e.g. **/pldisk:0**). *Default if omitted:* This option will be enabled.	

/plmem:*n*	PHYLockMemory=*n*

Use this option to control how much computer memory PHYLock will allocate for itself. You only need to increase the allocation size if you receive the error “PHYLock failed to cache changes” and increasing the PHYLock memory and/or disk cache (i.e. **/plcs** and/or **/pldcs**) has not solved the problem.

Replace *n* with either 2, 1, or 0. Using a value of 2 instructs PHYLock to use a smaller memory allocation, while 1 and 0 correspond to a normal and larger allocation, respectively.

Default if omitted: PHYLock uses a normal memory allocation.

/pldcs:*n*	PHYLockDiskCacheSize=*n*

Use this option to set the size in MiB of the disk cache Image for Windows should use. *n* should be a positive integer (e.g. 600, 1024, etc.) between 1 and 4095. You must also use /**pldisk** for /**pldcs** to have any effect.

Default if omitted: Image for Windows uses 600 MiB for the disk cache size.

/plwft:*n*	PHYLockWaitTime=*n*

Use this option to set the amount of time, in milliseconds (ms), during which writes to the source drive will prevent PHYLock from becoming enabled. Setting this parameter helps ensure that file truncation and/or corruption does not occur. Keep this value above 1250.

Default if omitted: Image for Windows uses 4250 ms.

/plmwt:*n*	PHYLockMaxWaitTime=*n*

Use this option to set the maximum amount of time, in minutes, that PHYLock will wait before it enables. You can use this option to prevent frequent disk writes from interfering with the start of a backup operation. Setting a value of 0 will instruct PHYLock to wait indefinitely.

Default if omitted: PHYLock will wait indefinitely until the wait time is satisfied or you cancel the operation.

/plcs:*n*	PHYLockCacheSize=*n*

Use this option to set the size, in kibibytes, of the memory cache Image for Windows should use for PHYLock. *n* should be a positive integer (e.g. 2048, 4096, etc.). You should not use a value below 2048 for this setting.

Default if omitted: PHYLock uses a 8192-KiB (8 MiB) memory cache.

/pltr	PHYLockThrottleOnReads=1

Use this option to enable or disable IO throttle on reads. Due to fast compression and the design of low level storage drivers, you may experience slow response times using applications during backup operations. This slowness is actually caused by IO being delayed on slower traditional spinning hard drives and not CPU utilization. **IO throttling** was introduced to alleviate this condition at the cost of potentially slowing down the backup operation. IO throttling is currently only used when PHYLock is active.

Using a value of 0 will disable this option (e.g. **/pltr:0**).

Default if omitted: This option will be enabled.

/pltw	PHYLockThrottleOnWrites=1

Use this option to enable or disable IO throttle on writes. Due to fast compression and the design of low level storage drivers, you may experience slow response times using applications during backup operations. This slowness is actually caused by IO being delayed on slower traditional spinning hard drives and not CPU utilization. **IO throttling** was introduced to alleviate this condition at the cost of potentially slowing down the backup operation. IO throttling is currently only used when PHYLock is active.

Using a value of 0 will disable this option (e.g. **/pltw:0**).

Default if omitted: This option will be enabled.

/pltd:*n*	PHYLockThrottleDelay =*n*

Use this option to control the amount of time the application delays after allowing pending IO to occur. This value should be kept low otherwise the program could be doing nothing if the IO completes before this delay expires. The only time you may want to extend it is if you expect multiple IO requests to occur that you want the application to wait for to prevent potential thrashing. This option is relevant only if IO throttling is enabled (**/pltr** and/or **/pltw**). Valid values are 0 through 20.

Note: The default timer in Windows has a resolution of 10ms. This means option values like 5ms, 12ms, etc.. really mean something more like 10ms or 20ms.

Default if omitted: PHYLock uses 0 for this setting.

/plta:*n*	PHYLockThrottleAbort =*n*

Use this option to set the maximum amount of time to wait for other IO to complete before continuing, even if more IO is pending. This value will be adjusted to be a multiple (rounded up) of the Delay value above. If set to zero then throttling is disabled. This option is relevant only if IO throttling is enabled (**/pltr** and/or **/pltw**). Valid values are 0 through 500.

Note: The default timer in Windows has a resolution of 10ms. This means option values like 5ms, 12ms, etc.. really mean something more like 10ms or 20ms.

Default if omitted: PHYLock uses 80 for this setting.

/plti:*n*	PHYLockThrottleInterval =*n*

Use this option to control how often the throttle may engage. Lower values throttle more often for better response time of other applications, but at the cost of slowing down the backup. Larger values throttle less often for a faster backup, but at the cost of potentially slowing down other applications. Setting this value to zero disables IO Throttling. This option is relevant only if IO throttling is enabled (**/pltr** and/or **/pltw**).

Note: The default timer in Windows has a resolution of 10ms. This means option values like 5ms, 12ms, etc.. really mean something more like 10ms or 20ms.

Default if omitted: PHYLock uses 100 for this setting.

/plwt	PHYLockWriteTracking =1

Use this option to enable PHYLock to track writes so that incremental backups complete quickly without having to read and check all data for changes. This option is part of PHYLock but not affected by the **/pldis** option since it also applies using VSS. The tracking is at a disk level so it only makes sense to use this on entire drive backups or where you only back up the same partitions continually and where the backups occur without a reboot. Since PHYLock is close to the drive on the driver stack, it is able to track writes that may bypass the filesystem, however it cannot track writes that occur from any driver closer to the drive than itself (as rare as that may be). In addition, it can only track writes that have been sent to the drive and would not detect changes that are cached. Therefore it's not recommended to use this option, but it is here for those that want the option of fast incremental backups. As always, don't let your incremental chain get too long or you'll eventually run out of file handles or memory (including those limits that may apply to the restore environment).

Default if omitted: PHYLock will not track writes.

/usevss	UseVSS=1

This option will cause Image for Windows to try using Microsoft's Volume Shadow Copy Services before using PHYLock on Windows 2003 or later. If VSS is unable to be started then PHYLock may be used.

Note: If **/novss** is used no attempt will be made to use VSS even if this option is specified.

Default if omitted: VSS is not used.

/uftnb	UseFilesToNotBackup=1

If you have configured the VSS **FilesNotToBackup** registry key, you can use this option to have Image for Windows exclude those files/folders when creating a backup image or copying a partition. This option applies only when VSS is enabled and used. Exclusions will be applied in the same manner as if the **/exlist** option were used.

Using a value of 0 will disable this option (e.g. **/uftnb:0**). When disabled and VSS is used, files/folders configured in the VSS FilesNotToBackup registry key will not be excluded by Image for Windows in the backup image or partition copy. Files/folders may still be excluded by VSS.

Default if omitted: This option will be enabled.

/uftns	UseFilesToNotSnapshot=1

If you have configured the VSS **FilesNotToSnapshot** registry key, you can use this option to have Image for Windows exclude those files/folders when creating a backup image or copying a partition. This option applies only when VSS is enabled and used. Exclusions will be applied in the same manner as if the **/exlist** option were used.

Using a value of 0 will disable this option (e.g. **/uftns:0**). When disabled and VSS is used, files/folders configured in the VSS FilesNotToSnapshot registry key will not be excluded by Image for Windows in the backup image or partition copy. Files/folders may still be excluded by VSS.

Default if omitted: This option will be enabled.

/vssluv	VSSLockUnsupportedVolumes=1

Use this option to have Image for Windows attempt to lock a partition when its volume name is in a format unsupported by VSS. If the lock fails and **/vssiuv** is used, the partition will be ignored. Otherwise, PHYLock may be used.

Note: If Image for Windows is unable to obtain a lock you can also specify the **/vssfd** option to attempt a forced dismount of the volume.

Using a value of 0 will disable this option (e.g. **/vssluv:0**). When disabled, an attempt will not be made to lock unsupported volumes. Image for Windows may revert to using PHYLock.

This option applies only when VSS is enabled and used.

Default if omitted: This option will be enabled.

/vssiuv	VSSIgnoreUnsupportedVolumes=1

Use this option to have Image for Windows ignore a partition when its volume name is in a format unsupported by VSS. The partition will be backed up or copied in the unlocked state. If any changes are made to the data on the partition during the operation and a byte-for-byte validation (**/vb**) is used the validation will fail.

Note: This option can be used for Simple Operations mode procedures.

Using a value of 0 will disable this option (e.g. **/vssiuv:0**). When disabled, unsupported volumes will not be ignored. Image for Windows may revert to using PHYLock.

This option applies only when VSS is enabled and used.

Default if omitted: This option will be enabled.

/vssfd	VSSForceDismount=1

Use this option to have Image for Windows attempt to force dismount an unsupported volume when attempting to lock it (**/vssluv**) if the lock fails. All open handles on the volume will be invalidated, which may result in data loss.

This option applies only when VSS is enabled and used.

Default if omitted: Image for Windows will not attempt to force dismount unsupported volumes.

/vsscm	VSSComponentMode=1

Use this option to only enable VSS components that are needed based on the partitions being backed up or copied.

Using a value of 0 will disable this option (e.g. **/vsscm:0**). When disabled, all components are used automatically.

This option applies only when VSS is enabled and used.

Default if omitted: This option will be enabled.

/vssifn	VSSIfNoLock=1

Use this option to attempt a normal lock and only add the partition to the VSS snapshot if locking fails. The partition remains locked during the backup or copy operation.

Using a value of 0 will disable this option (e.g. **/vssifn:0**). When disabled, a normal lock will not be attempted first. The partition will be added to the VSS snapshot.

This option applies only when VSS is enabled and used.

Default if omitted: This option will be disabled.

/vssfso	VSSForSimpleOperations=1

Use this option to attempt using VSS for the backup or copy when Simple Operations mode is enabled. The Exclude Files options (**/uftnb** and **/uftns**) are automatically used with Simple Operations when VSS is used.

Using a value of 0 will disable this option (e.g. **/vssfso:0**) and prevent VSS from being used with Simple Operations mode without needing to use the **/novss** option.

Note: If **/novss** is used no attempt will be made to use VSS even if this option is enabled.

Default if omitted: This option will be enabled.

Image for Windows Backup Options

In Table 3, you find the command line options that you must set to use Image for Windows to make a backup image.

The table shows you both the command line option and the INI file variable. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Backup_Defaults] section.

Table 3: Image for Windows Required Backup Parameters

Command Line Option	INI Variable
/b	N/A

Use this option to indicate that you want to perform a backup.

Also required: Either **/d** option to specify a full backup or **/base** option (for differential or incremental backup) and the **/f** option to specify target image file destination.

/d	N/A

Use when performing a full backup to identify the source hard drive and partition. For most users, the partition ID will be a number from 1 through 4. For partition IDs of 9 or below, you can use a single digit in place of hexadecimal notation (e.g. 1 is equivalent to 0x1, and 5 is equivalent to 0x5).

The volume ID will be a number formatted as 0x*PVV*, where *P* is the extended partition and *VV* is the volume number in hexadecimal from 01 to FF.

If you are not sure what the partition or volume ID is, run Image for Windows using the interface, choose the Backup option, and click Next. The screen that lists the partitions

and volumes also will display the ID in parentheses as a hexadecimal number. You should prefix that number with a 0x on the command line.

/d:d@p /d:wd@p /d:?D: /d:#ntsig /d:{GUID}	d is the source hard drive number p is the source partition or volume ID (hex or decimal notation), depending on whether you are referring to a partition or a volume. D: is the source drive letter. # – NT Disk Signature Follows {GUID} – GPT Disk GUID You can use device modifiers as needed. When you use them, you must place them after the **/d:** and before the source hard drive number: w – Windows device. v – Virtual drive. ? – Drive letter follows. The **/d** option cannot be used with the **/base** option.

/base	N/A
Use when performing a differential or incremental backup to identify the backup on which Image for Windows should base this backup.	
/base:x:\bkup /base:x:\mypath\bkup /base:"x:\my path\bkup" Or: /base:d@p:\bkup /base:d@p:\mypath\bkup /base:"d@p:\my path\bkup" /base:#ntsig@p:\mypath\bkup /base:{GUID}@p:\mypath\bkup	*x:*\ is source drive letter mypath or my path is path to bkup *bkup* is name of existing backup (omit file extension) Or: Specify source device, partition, path, and file name: d is source hard drive number p is source partition ID (hex or decimal notation) # – NT Disk Signature Follows {GUID} – GPT Disk GUID You can use device modifiers as needed. When you use them, you must place them after the **/base:** and before the source hard drive number: w – Windows Device

	o – Optical drive v – Virtual drive Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of quotes. The **/base** option cannot be used with the **/d** option.

/f	N/A
Use this option to specify the target drive letter, path, and file name for a backup file.	
/f:x:\filename /f:x:\mypath\filename /f:"x:\my path\file name" Or: /f:d@p:\filename /f:d@p:\mypath\filename /f:"d@p:\my path\filename" /f:#ntsig@p:\mypath\filename /f:{GUID}@p:\mypath\filename	*x:*\ is target drive letter *mypath* or *my path* is path to filename *filename* is target file name for image Or: Specify target device, partition, path, and file name: d is target hard drive number p is target partition ID (hex or decimal notation) # – NT Disk Signature Follows {GUID} – GPT Disk GUID *mypath* or *my path* is path to filename *filename* is target file name for image Device modifiers may be used as needed. When used, they must be placed after the **/f:** and before the target hard drive number: w – Windows Device o – Optical drive (when you combine this option with the option mentioned above, this option must come last) v – Virtual drive Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of quotes. o can be use with a, u, f, and s

The above options are required when you perform a backup using Image for Windows from the command line. In Table 4, you find a list of the optional backup parameters you can use when you run Image for Windows from the command line.

The table shows you both the command line option and the INI file variable. In some instances, both forms of the options are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Backup_Defaults] section.

Table 4: Image for Windows Optional Backup Parameters

Command Line Option	INI Variable
/pw:*mypassword* or /pw:{#*name*#}	N/A
Use this option to set a password for Image for Windows to use in conjunction with simple password protection or AES encryption. Your password cannot exceed 128 characters and may contain upper/lowercase letters, numbers, special characters, spaces, and non-ASCII characters. You can also specify a stored password (created in Settings or by the **/login:** option) by using the following format (where *name* is the user for the login): /pw:{#*name*#} If the password or *name* contains spaces, surround it with quotation marks. For example: /pw:"my password" *or* /pw:"{#john doe#}" You must use this option if you also specify **enc:1** or **enc:3**, described later in this table. This option can be specified multiple times as required by the backup image chain (base + differential/incrementals). The first password specified will be used for the newly created image. *Default if omitted*: Image for Windows does not assign a password, and the backup will be neither password protected nor encrypted.	
/sch:*"path"*	N/A

Use this parameter to specify the search paths Image for Windows uses when looking for base images in the backup chain. *path* can use the *d@p:\path* format to specify the drive and partition id.
 	
This option can be used multiple times to specify multiple search paths (e.g. when the images in the backup chain are not all stored in the same folder).
 	
Examples (commands should be on one line):
 	
`imagew /b /v /hash /base:"E:\Backups\Win8System - Inc C" /f:"E:\Backups\Win8System - Inc D" /sch:"E:\Backups" /sch:"E:\Backups\Archive"`
 	
`imagew /b /v /hash /base:"w1@0x2:\Images\WinXP Drive - Inc D" /f:"w1@0x2:\Images\WinXP Drive - Inc E" /sch:"w1@0x2:\Images" /sch:"w1@0x2:\Images\Full"`
 	
Default if omitted: Image for Windows searches only the folder of the specified image for	

base images in the backup chain.

/fd	ForceDismount=1

Use this option to force dismounting a volume (partition) that can't be locked for backup when PHYLock or VSS is not used. Using this option will invalidate all opened handles to the volume, which may result in lost data. Image for Windows will attempt to lock the volume after forcing the dismount.

Default if omitted: Normal locking without forcing a dismount occurs.

/rb:n	N/A

Instructs Image for Windows to reboot, shutdown, suspend, or hibernate the computer after completing the backup operation. The value n can be 1 to reboot with all prompts, 2 to reboot with completion message, but without reboot message (error does not cancel reboot), 4 to reboot without completion message or reboot message (error cancels reboot), 8 to shutdown, 16 to suspend (sleep), or 32 to hibernate. If the specified option is not supported by the system the next one will be used in the following order: suspend, hibernate, shutdown.

Default if omitted: Image for Windows attempts to determine if the computer needs to be rebooted after completing the backup and, if so, prompts you to reboot.

/bc	BackwardsCompatible=1

Current versions of Image for Windows may use a TBI format that is not compatible with prior versions. Enable this option to have Image for Windows create the TBI file using a format that is compatible with version 2.50. If desired, also use `/bcl` (BackwardsCompatibleLevel) to specify a more current file version.

Default if omitted: Image for Windows uses the current TBI format.

/md	MakeDir=1

This option causes Image for Windows to always create the target path if doesn't exist.

Default if omitted: Image for Windows doesn't attempt to create the target path.

/mp	MultiPass=1

Use this parameter to tell Image for Windows to use **Multi Pass** mode when creating a differential or incremental backup. In **Multi Pass** mode, Image for Windows compares the source partition against the full backup in one pass and performs the backup in a second pass. This setting is not applicable when performing a full backup. This option *must* be used if the applicable full backup resides on removable media.

Default if omitted: Image for Windows uses **Single Pass** mode, identifying changes and backing up in one pass.

/cdws:*n*	CDWriteSpeed=*n*

Use this setting to specify the *maximum* disc writing speed that Image for Windows will use when burning to disc media (CD/DVD/BD) and force a lower writing speed than that automatically used by the optical drive's firmware. Slower writing speeds may increase

reliability.

n should be a positive integer (e.g. 2, 4, 16, etc.).

The maximum writing speed that Image for Windows actually uses is determined by whichever is *lower*: The ***/***cdws:***n*** value you specify or the speed deemed appropriate by the drive's firmware, according to the disc media in use. For example, if you are using media that is rated at 8X for burning, the maximum writing speed will be no more than 8X, regardless of the setting you choose here. Similarly, if you supply a value that is beyond or invalid for the drive's design limits, the drive will automatically use the next-highest speed supported by both the drive and the media in use.

DVD speeds are approximately 1/8 CD speeds, so if you are using DVD discs, multiply the desired speed by 8 to determine the value to use. For example, to obtain a maximum burning speed of 2X with a DVD, use ***/***cdws:***16***, since 8 × 2X = 16.

Default if omitted: Image for Windows uses the **Optimal** speed setting.

/max:*n*MiB or /max:*n*GiB	MaxFileSize=*n*MiB or MaxFileSize=*n*GiB

Use this setting to specify the maximum file size of the image files that Image for Windows creates.

n should be a positive integer (e.g. 648, 698, 877, 1003, etc.). Image for Windows can use either mebibytes or gibibytes, so you must specify either **MiB** or **GiB**, respectively. Do not place any spaces between the number and the unit designation. Decimal values are supported (e.g. 2.5GiB).

The maximum file size is ultimately dictated by the file system used on the target drive. Also, some network redirectors limit file size to 2 GiB, which can be a limiting factor for backup files stored on a network drive.

Default if omitted: Image for Windows uses the maximum file size supported by the target file system.

/raw	RawMode=1

Set this parameter to force Image for Windows to use raw mode, which backs up all sectors, rather than just used sectors, even for recognized file systems.

NOTE: This option will cause Validate Byte-for-Byte to fail if VSS or PHYLock is used.

For entire drive backups this option causes a raw sector by sector backup (and later restore) of the entire drive without regard to any partitions or adjustments.

Note: This option is not applicable when creating a differential or incremental backup. Instead, the new backup will use the setting as specified when the base image was created.

Default if omitted: Image for Windows backs up only used sectors backed up for recognized file systems and uses raw mode automatically for unrecognized file systems.

/skp:0	SkipPageFile=0

Set this parameter to instruct Image for Windows to include the page files (`pagefile.sys`, `swapfile.sys`) in the backup.

Default if omitted: Image for Windows skips page files.

/skh:0	SkipHiberFile=0

Set this parameter to instruct Image for Windows to include the hibernation file (`hiberfil.sys`) in the backup.

Default if omitted: Image for Windows skips the hibernation file.

/v	PostValidate=1

Set this parameter to instruct Image for Windows to perform a standard validation of the image file(s) as part of the backup operation.

Default if omitted: Image for Windows does not validate the backup image after creating it.

/vb	PostValidate=2

Set this parameter to instruct Image for Windows to perform a byte-for-byte validation of the image file(s) as part of the backup operation. This also performs a standard validation.

Default if omitted: Image for Windows does not validate the backup image after creating it.

/vpd	ValidateDisk=1

You can use this option when saving images to a CD or DVD drive. This option ensures that the discs containing image files are readable and verifies that the data on the discs appears to be the same as the data that Image for Windows used to create the discs. Per-disc validation can detect media errors that may have occurred during the disc writing process. If Image for Windows detects an error, Image for Windows will prompt you to recreate the failed disc.

Default if omitted: If you do not enable this option, Image for Windows will notify you of errors only after the backup process completes, and you will need to recreate all discs in the backup.

/ldu	LimitDiscUsage=1

You can use this option when saving images to a CD or DVD drive. This option leaves the last 10% of the disc unused which tends to encounter more data errors.

Default if omitted: If you do not enable this option, Image for Windows will use the entire disc.

/comp:*n*	Compression=*n*

Specifies how Image for Windows should compress backup files as they are created. Valid values for *n* are **0** through **15**. The equivalent *n* values for the GUI compression options are as follows:

0 – None
1 – Standard
2 – Enhanced Size - A (*Enhanced - Normal* prior to version 2.72)

7 – Enhanced Size - B (*Enhanced - Slower* prior to version 2.72)
10 – Enhanced Size - C (*Enhanced - Slowest* prior to version 2.72)
11 – Enhanced Size - D
12 – Enhanced Size - E
13 – Enhanced Size - F
14 – Enhanced Speed - A
15 – Enhanced Speed - B

The **Enhanced Size - D/E/F** options are faster than **Enhanced Size - A/B/C**, but provide less compression. Backup files will normally be compressed more than the **Standard** option. Enhanced Size values 2-10 offer increased compression as the value increases at the expense of speed. Enhanced Size values 11-13 (D/E/F) offer slightly less compression at a faster speed than their 2/7/10 (A/B/C) counterparts.

The **Enhanced Speed - A/B** options offer decent compression with the emphasis on back up speed over backup file size. Backup files will normally be compressed less than the **Standard** option. Value 15 offers higher compression than 14 at the expense of speed.

Actual compression levels and speeds obtained will vary depending on the data being backed up and the system being used.

Note: The **Enhanced Size - D/E/F** options and the **Enhanced Speed - A/B** options are not backwards compatible and require version 2.72 or later. Attempting to open a backup file created using a compression value higher than 10 with version 2.71 or earlier will result in a message to use the newer version or an error message that the image is corrupt (depending on the older version being used).

Default if omitted: Image for Windows uses Enhanced Speed - A compression.

/enc:1 or /enc:3	Encryption=1 or Encryption=3

Specifies whether simple password protection *without* encryption (**/enc:1**), or 256-bit AES encryption (**/enc:3**) is to be used. If either **/enc:1** or **/enc:3** are specified, **/pw** is also required.

Default if omitted: No encryption or password protection is used.

/noej	NoEject=1

Use this parameter to tell Image for Windows never to automatically open the optical drive tray.

Default if omitted: Image for Windows will automatically open the optical drive tray whenever a new disc is needed and at the completion of the backup operation.

/cdrs:*n*	CDReadSpeed=*n*

Use this setting to specify the *maximum* disc reading speed that Image for Windows will use when reading disc media (CD/DVD/BD) during the validation phase of a backup operation, with *n* being a positive integer (e.g. 2, 4, 16, etc.). This setting may be used to force a lower reading speed than that automatically used by the optical drive's firmware. Slower reading speeds may increase reliability.

n should be a positive integer (e.g. 2, 4, 16, etc.).

This setting is only applicable when you are backing up to disc media and you have also included either the **/v** or **/vb** option.

The maximum reading speed that is actually used is determined by whichever is *lower*: The **/cdrs**:***n*** value that you specify, or the speed deemed appropriate by the drive's firmware, according to the disc media in use. For example, if you are using media that is rated at 32X (for reading), the maximum reading speed will be no more than 32X, regardless of the setting you choose here. Similarly, if you supply a value that is invalid for or beyond the drive's design limits, the drive will automatically use the next-highest speed supported by both the drive and the media in use.

DVD speeds are approximately 1/8 CD speeds, so if you are using DVD discs, multiply the desired speed by 8 to determine the value to use here. For example, to obtain a maximum reading speed of 4X with a DVD, use **/cdrs**:***32***, since 8 × 4X = 32.

Default if omitted: Image for Windows uses the **Optimal** speed setting.

/iobs:n	IOBS=n

Include this option to try to improve I/O performance in cases where network or USB device performance is poor. This can also help improve end-user performance of saving data files while imaging is occurring, particularly when the backup target is a slower link. Provide n as the letter A to automatically try to determine the best value, otherwise try a value such as 1, 2, or 3.

Default if omitted: Image for Windows does not use this option.

/err	AllowErrors=1

Use this option to tell Image for Windows to ignore read/write errors caused by bad sectors on the *source* drive during the backup operation. Image for Windows will also ignore errors during the validation phase. This parameter does not apply to bad sectors on the *target* drive.

Default if omitted: Image for Windows will notify you concerning the error and give you the option to continue or abort.

/mf	N/A

Instructs Image for Windows to use **Multiple File Set** mode. Select this option to create a backup that is comprised of one image for every individual partition that you back up.

Default if omitted: Image for Windows uses **Single File Set** mode and creates a single image, regardless of the number of individual partitions you back up.

/desc:"*my description*"	N/A

Use this option to specify the descriptive text you want Image for Windows to associate with the backup, up to 511 characters (note that command line length limits may not allow a maximum length description). If your descriptive text includes spaces, surround it with quotation marks: /desc:*"my description"*

Default if omitted: Image for Windows doesn't add any descriptive text.

/purge:n	Purge=n

This option is used to delete image files that are n days old or older. You can think of it as the number of days to retain images. It's only used during a command line backup and only processes the target folder of the current file specified using the /f option. Care should be taken as the purge occurs prior to the backup. As an option you can have the purge take place only after a successful backup by providing n as a negative number. E.g. /purge:-15

Default if omitted: No image files are purged.

/filetpl:"filename"	FileTemplate=filename

Sets the default file name offered during interactive use of the program during backup operations.

Default if omitted: The program uses a name that includes the device, partitions and date.

/nt	NoTRIM=1

Reduces the amount of caching required for the source drive on systems with TRIM enabled by disabling TRIM during the backup operation. When TRIM is enabled the original contents of deleted sectors must be cached, whereas a normal delete doesn't overwrite the sectors and instead just updates the directory entry. **Note:** If the operation doesn't complete (due to reboot, shutdown, process forced to end, etc.) TRIM will stay disabled until enabled using the Windows fsutil program (`fsutil behavior set DisableDeleteNotify 0`). If IFW completes the operation, even with errors reported, TRIM will be properly reset to the enabled state.

Default if omitted: Image for Windows does not disable TRIM during a backup operation.

/hash	CreateHash=1

Use this option to have Image for Windows create a hash file to speed up creating a Changes Only (differential or incremental) backup. This option is only available when creating an image that is not being saved to disc media (CD/DVD/BD). By default, this option is also ignored if the `/bc` (BackwardsCompatible) option is enabled. The hash file will be limited to the max file size and have the same file name as the backup with an extension starting at .#0 followed by .#1, .#2, etc. as needed. The actual speed increase realized when creating an image will vary depending on the system. If the hash file is deleted the backup will proceed as normal without it.

This option can also be used to create a hash file for an existing image. For example: `/hash /f:"e:\backups\win7full.tbi"`

Default if omitted: Image for Windows does not create the hash file during a backup operation.

/exlist=*filename*	N/A

IMPORTANT NOTE: This option is used at your own risk. Please make sure to create standard backups of important data.

This option allows you to specify a file which contains a list of paths and/or files to exclude from the backup image. The file must be ANSI text and located on the local file system. FAT, FAT32, and NTFS file systems are supported (the option will be ignored

for other file systems).

The data of the excluded files is essentially compressed to zero. When restored, the files will either be deleted or truncated (depending on the options selected). Note that even though excluded, the data will still affect the minimum restore size (just as if it wasn't excluded). Additionally, the excluded files and folders will still show up in TBIView and TBIMount. Excluded files extracted from the image using TBIView or TBIMount will be full of zeros. An exception to this are very small files on NTFS (the contents of those files will be intact).

When creating a differential or incremental backup using a base full image created with the /exlist option, the list from the base image will be used (a new list specified for the backup will be ignored). Otherwise, the specified exclusion list will be used for the backup.

Each line in the exclusion file should be in the following format:

`[options]path >`

Valid `options` are:

- `f` - Exclude files only. Do not delete folders. If not specified, folders will be deleted.
- `t` - Truncate files instead of deleting them. Folders will not be deleted. Files are restored with a size of zero bytes.
- `k` - Keep the base folder (instead of deleting it) when recursion is used and the entire contents are excluded.

The `path` can be complete to exclude a specific folder (e.g. `\Games`) or you can use wildcards (`*`, `?`) to specify matching files. When excluding a folder, use a trailing backslash (`\`) to indicate a folder is specified (otherwise, a search will be made for matching files). Do not surround the path with quotes even if it includes spaces. Do not specify a drive letter.

To also exclude files from subdirectories (apply recursion), include the > (greater than) character after the path.

Examples:

```
[t]*.jpg          - exclude all *.jpg files in the root folder, files will be truncated
\*.iso            - exclude all *.iso files in the root folder
\Backups\*.tbi    - exclude all *.tbi files in the \Backups folder
[k]\Games\ >      - exclude the \Games folder and all sub-folders, keep
                    the \Games folder (use trailing backslash to indicate folder)
\Work\Archive\    - exclude the \Work\Archive folder, sub-folders not excluded
                    (use trailing backslash to indicate folder)
*.jpg >           - exclude all *.jpg files in the root folder and all sub-folders
[f]\Movies\*.mpg >  - exclude all *.mpg files in the \Movies folder and all
                      sub-folders, folders will not be deleted
\ISO Files\Old\*.iso >  - exclude all *.iso files in \ISO Files\Old folder and all
                          sub-folders
```

Default if omitted: Image for Windows includes all files on the partition in the backup (the page file and hibernation file will be included or excluded per their respective options).

/log:0	SaveLog=0
Disables logging. *Default if omitted*: Image for Windows logs during a backup operation.	

Image for Windows Restore Options

In Table 5, you find the command line options that you must set to use Image for Windows to restore a backup image.

The table shows you both the command line option and the INI file variable. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Restore_Defaults] section.

Table 5: Image for Windows Required Restore Parameters

Command Line Option	INI Variable
/r	N/A
Use this option to indicate that you want to restore an image file. *Also required:* The ***/f*** option to specify image file Image for Windows should use when restoring.	

/d	N/A
Use when restoring a backup to identify the target hard drive and partition. Image for Windows will restore the image to the same hard drive number and physical location on the drive that you backed up unless you override this setting. If the target partition was a volume and no extended partition now exists at the original location, Image for Windows will attempt to create the original extended partition. If Image for Windows cannot create the extended partition, Image for Windows will restore the image as a primary partition. If the target partition was originally a primary partition and an extended partition now exists at that location, Image for Windows will restore the image as a volume. If an existing partition or volume occupies the same starting location as the partition you want to restore, Image for Windows will display a warning message before overwriting the partition or volume. You can suppress this warning message, as described in Table 5.)	
/d:d@p /d:wd@p /d:?D: /d:#ntsig /d:{GUID}	d is the target hard drive number p is the target partition or volume ID (hex or decimal notation), depending on whether you are referring to a partition or a volume. Use this parameter only if you are restoring an individual partition. D: is the target drive letter. # – NT Disk Signature Follows (or omit

	signature to match on original signature) {GUID} – GPT Disk GUID (or omit GUID to match on original GUID) You can use device modifiers as needed. When you use them, you must place them after the **/d:** and before the target hard drive number: w – Windows device. v – Virtual drive. ? – Drive letter follows.

/f	N/A
Use this option to specify the target drive letter, path, and file name for a backup file. It can also be used to connect to a multicast server.	
/f:x:\filename /f:x:\mypath\filename /f:"x:\my path\file name" Or: /f:d@p:\filename /f:d@p:\mypath\filename /f:"d@p:\my path\filename" /f:#ntsig@p:\mypath\filename /f:{GUID}@p:\mypath\filename	*x:*\ is target drive letter *mypath* or *my path* is path to filename *filename* is target file name for image Or: Specify target device, partition, path, and file name: d is target hard drive number p is target partition ID (hex or decimal notation) # – NT Disk Signature Follows {GUID} – GPT Disk GUID *mypath* or *my path* is path to filename *filename* is target file name for image Device modifiers may be used as needed. When used, they must be placed after the **/f:** and before the target hard drive number: w – Windows device o – Optical drive (when you combine this option with the option mentioned above, this option must come last). Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of quotes.

/f:\\\server*port*sessionname*password *Examples:* /f:\\\192.168.0.16*** /f:"\\\OfficeServer**Win8 Clean*pswd"	Used to connect to a multicasting server. Use quotes if any of the values contain a space. Default values will be used for port, sessionname, and password if not specified. server – Specify the system running the multicasting server. port – Specify the port to use. The default is port 54312. sessionname – Specify the session name. No session name is used if omitted. password – Specify the password for the session. Omit if no password is required.

Table 5 describes options required to restore a backup using Image for Windows from the command line. Table 6 lists optional restore parameters for both the command line option and the INI file variable. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Restore_Defaults] section, unless as noted otherwise.

Table 6: Image for Windows Optional Restore Parameters

Command Line Option	INI Variable
/o	N/A
Use this option to tell Image for Windows to overwrite the target without first prompting for confirmation. *Default if omitted*: Image for Windows prompts before overwriting the target.	

/base	N/A
Note: Beginning with Image for Windows 2.78 this parameter is optional when restoring a differential or incremental backup and should normally be omitted. Instead, use the **/sch** option if it's necessary to specify the location of any of the base images. When restoring from a differential or incremental backup, use this parameter to identify the base backup Image for Windows should use.	
/base:x:\bkup /base:x:\mypath\bkup /base:"x:\my path\bkup" Or: /base:d@p:\bkup /base:d@p:\mypath\bkup /base:"d@p:\my path\bkup"	*x:*\ is source drive letter mypath or my path is path to bkup *bkup* is name of the base backup (omit the file extension) Or: Specify source device, partition, path, and file name: d is source hard drive number

/base:#ntsig@p:\mypath\bkup /base:{GUID}@p:\mypath\bkup	p is source partition ID (hex or decimal notation) # – NT Disk Signature Follows {GUID} – GPT Disk GUID You can use device modifiers as needed. When you use them, you must place them after the **/base:** and before the source hard drive number: w – Windows device o – Optical drive (when you combine this option with any of the options mentioned above, this option must come last). Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of quotes.

/clr	N/A
Use this option to have Image for Windows clear the MBR and EMBR prior to restoring an image file. *Default if omitted*: Image for Windows does not clear the MBR and EMBR.	

/rb:n	N/A
Use this option to have Image for Windows reboot, shutdown, suspend, or hibernate the system after restoring an image. The value n can be 1 to reboot with all prompts, 2 to reboot with completion message, but without reboot message (error does not cancel reboot), 4 to reboot without completion message or reboot message (error cancels reboot), 8 to shutdown, 16 to suspend (sleep), or 32 to hibernate. If the specified option is not supported by the system the next one will be used in the following order: suspend, hibernate, shutdown. If suspend or hibernate is requested and a shutdown or reboot is required, a shutdown is performed instead. *Default if omitted*: Image for Windows attempts to determine if the computer needs to be rebooted after restoring and, if so, prompts you to reboot.	

/fd	ForceDismount=1
Use this option to force dismounting a volume (partition) that can't be locked for restore. Using this option will invalidate all opened handles to the volume, which may result in lost data. Image for Windows will attempt to lock the volume after forcing the dismount. *Default if omitted*: Normal locking without forcing a dismount occurs.	

/sp:*p*	N/A
Use this option to specify an individual partition ID to restore from a full backup. *p* is the	

source partition ID (in hex or decimal notation).

Default if omitted: If you supply a backup of an entire hard drive as the source for restoring, Image for Windows will restore all partitions contained in the backup.

/sig	ReplaceNTSig=1

This option applies when you restore a partition that had been assigned a drive letter within Windows prior to being backed up. If you select this option, Image for Windows will restore the disk signature associated with the source partition. If you are restoring a partition that had been assigned a drive letter in Windows and you wish to keep that drive letter assignment, select this option.

Note: The source Windows drive letter assignment will only be kept if it was previously assigned on the Windows system where the restored partition is used and the drive letter is not currently in use by another partition.

Note: The disk GUID of a target GPT drive will not be changed.

Default if omitted: Image for Windows will use the disk signature already present in the MBR of the target drive; if none exists, Image for Windows will create one if necessary.

/csig	ChangeNTSig=1

When performing full drive restores, this option allows you to change the NT Signature restored to the target drive. For target GPT drives, the MBR NT Signature, the GPT Disk GUID, and the partition GUIDs will all be changed. This can be useful if you plan on having both the original and restored hard drive in the same computer at the same time while running Windows; otherwise Windows may detect the duplicate signature and modify it which may (depending on the OS) prevent the restored hard drive from booting properly.

When restoring single or multiple partitions to a GPT drive, this option will change the GUID of each partition restored.

To retain the existing signature used by the target drive also specify the **/csigut** option.

Default if omitted: Image for Windows will not change the restored disk signature, drive GUIDs, or partition GUIDs.

/chgvsn	ChgVolSN=1

Use this option to change the file system volume ID/serial number of restored FAT//FAT32/NTFS/HPFS partitions and the UUID of Ext2/3/4 partitions.

Default if omitted: The file system volume ID/serial number or UUID is not changed.

/nvn:"*name*"	NewVolumeName=*name*

Use this option to specify the new volume name (label) for the restored partition. If multiple partitions are being restored they will all be set to the specified name.

For example:

```
imagew /r /d:w3@0x4 /f:"H:\mybackup" /sp:0x4 /nvn:"Win8 Copy"
```

Default if omitted: The volume name will not be changed from its restored value.

/ohd	UseOrgHDNum=1

Use this option to tell Image for Windows to keep references to the source hard drive number intact within the partition after Image for Windows has restored the partition to the target drive. This option is primarily used for Linux partitions.

Default if omitted: If the target drive number differs from that of the source drive, Image for Windows will update applicable drive references residing within the restored partition to reflect the new hard drive number.

/a	SetActive=1

Use this parameter to make the partition you restore active.

Default if omitted: Image for Windows does not make the restored partition active unless no other partitions are active and the restored partition is HD0.

/t	WriteMBR=1

Use this parameter to have Image for Windows install standard MBR code after completing the restore operation. Standard MBR code is the code that boots the active partition.

Default if omitted: Image for Windows does not write standard MBR code unless the MBR is empty.

/e	UseSameMBREntry=1

Use this parameter to have Image for Windows move the partition table entry of the restored partition to the same location in the master partition table as it appeared on the source drive. Image for Windows will move the existing partition table entry to another location rather than overwriting it.

Default if omitted: Image for Windows does not move the partition table of the restored partition.

/ms:n	N/A

Use this parameter to have Image for Windows move the partition table entry of the restored partition to a given slot in the MBR. The value n is 0 to 3. This option is only applicable when restoring a single partition.

Default if omitted: Image for Windows does not move the partition table of the restored partition.

/embrid:n	N/A

This parameter is used to set a specific ID value to the restored partition if an EMBR exists. The ID is only used if not already in use by another partition. To assume the same ID as a partition being overwritten, use the value zero for n.

Default if omitted: Image for Windows uses the restored partition's original id.

/gpt	N/A

Instruct Image for Windows to create a GPT on the target drive. Note that restoring first

track overrides this option. This is mainly used with the /clr option to ensure the full size of the drive that is greater than 2TiB is accessible. You can also provide an option /nomsr if the GPT to be created should not have a Microsoft Reserved Partition created on it. While Image for Windows supports a GPT, it does not currently officially support an EFI based system.

Default if omitted: Image for Windows does not create a GPT on the drive.

/rft	RFT=1

Use this parameter to have Image for Windows restore the first track when it restores the partition. Restoring the first track may also change the disk type (MBR/EMBR/GPT) of the destination drive if it doesn't match that of the source drive (the restore will abort if the change is required and cannot be applied).

Default if omitted: Image for Windows does not restore the first track.

/fts:*n*	RFTS=*n*

Use this option to specify how many sectors of the first track of the hard drive Image for Windows should restore. Use 0 to indicate the entire track

Default if omitted: Image for Windows determines the number of tracks needed to restore.

/stt	Scale=1

For NTFS/FAT/FAT32/EXT 2/3/4 partitions, use this parameter to tell Image for Windows to resize each restored partition proportionally, so that each partition takes up the same relative amount of space on the target drive as it did on the source drive. Unpartitioned free space that existed on the source drive at the time of the backup will still exist at the end of the target drive after Image for Windows completes the restore operation.

This option only applies when you restore an entire hard drive;

Default if omitted: Image for Windows does not scale each restored partition.

/x	Expand=1

For NTFS/FAT/FAT32/EXT 2/3/4 partitions, when restoring to a target that is larger than the source partition, use this parameter to have Image for Windows expand the partition after completing the restore operation.

This option is equivalent to the "Scale to Fit" option for fully restoring drives.

Default if omitted: Image for Windows will not expand the partition, and free space will remain after Image for Windows completes the restore operation.

/kf:*n*	KeepFree=*n*

Use this parameter if you also use either **/x** or **/stt** to specify the amount of space, in mebibytes (MiB), that Image for Windows should leave free.

Default if omitted: Image for Windows will fill the entire available area.

/m	FirstFit=1

When restoring a partition, use this parameter to tell Image for Windows to choose the target area automatically, based on the first area of available free space large enough to accommodate the partition you want to restore.

When restoring or copying a full drive, this parameter will remove any gaps (free space) between partitions, restoring them adjacent to each other.

Default if omitted: You must explicitly specify the target area when restoring a partition. Gaps may exist between restored partitions when restoring or copying a full drive.

/last	LastFit=1

Use this parameter to have Image for Windows place the restored partition at the top of the last free block large enough (e.g. restore to the end of the drive). This option is valid only when restoring a single partition and doesn't support resizing.

Default if omitted: Image for Windows will restore the partition normally toward the start of the drive or free space area.

/rp:*n*	N/A

This option is intended for use when restoring multiple partitions from a backup image located on a recovery partition to the drive containing the recovery partition. All partitions on the drive except the partition indicated by the ID value *n* will be deleted prior to the restore. Typically this option would be used with **/x /rft** or **/x /m /rft**. Scaling of the restored partitions will operate as if a full drive image were being restored.

This option is only supported when restoring multiple partitions and cannot be used when restoring an entire drive image.

Due to the way this option functions and scaling is performed, placing the recovery partition at the start of the drive is recommended. This allows easy scaling to different size drives when restoring.

Example: A Windows drive contains the following four partitions:

ID 0x1 Recovery Partition
ID 0x2 System Reserved
ID 0x3 Windows
ID 0x4 Data

The Recovery partition contains a backup image of partitions 0x2, 0x3, and 0x4. A restore of those partitions that would scale to a different size drive would be performed by running the following command:

```
imagew /r /d:w0 /f:w0@0x1:\Recovery.tbi /sp:0x2,0x3,0x4 /x /rft /rp:0x1 /ubp
```

Default if omitted: Image for Windows will not support scaling a multi-partition restore.

/v	PreValidate=1

Use this parameter to have Image for Windows perform a standard validation on the image file(s) prior before restoring them.

Default if omitted: Image for Windows does not validate the image files before restoring them.

/vb	PostValidate=2

Use this parameter to have Image for Windows check that each byte from the source image file was restored to the drive properly.

Default if omitted: Image for Windows does not validate the restored data.

/sch:*"path"*	N/A

Use this parameter to specify the search paths Image for Windows uses when looking for base images in the backup chain. *path* can use the *d@p:\path* format to specify the drive and partition id.

This option can be used multiple times to specify multiple search paths (e.g. when the images in the backup chain are not all stored in the same folder).

Examples (commands should be on one line):

```
imagew /r /f:"E:\Backups\Win8System - Inc D" /sch:"E:\Backups"
/sch:"E:\Backups\Archive"
```

```
imagew /r /f:"w1@0x2:\Images\WinXP Drive - Inc E"
/sch:"w1@0x2:\Images" /sch:"w1@0x2:\Images\Full"
```

Default if omitted: Image for Windows searches only the folder of the specified image for base images in the backup chain.

/pw:*mypassword* or /pw:*"my password"*	N/A

Use this parameter to supply the password needed to decrypt a backup that you encrypted and/or password protected when you created it. If your password contains embedded spaces, place quotation marks around it.

This option can be specified multiple times as required by the backup image chain (base + differential/incrementals).

Default if omitted: Image for Windows does not supply a password.

/noej	NoEject=1

Use this parameter to tell Image for Windows to never automatically open the optical drive tray.

Default if omitted: Image for Windows will automatically open the optical drive tray whenever a new disc is needed and when Image for Windows finishes restoring.

/cdrs:*n*	CDReadSpeed=*n*

Use this setting to specify the *maximum* disc reading speed that Image for Windows will use when reading disc media (CD/DVD/BD) while restoring a backup image, with *n* being a positive integer (e.g. 2, 4, 16, etc.). This setting may be used to force a lower reading speed than that automatically used by the optical drive's firmware. Slower reading speeds may increase reliability.

n should be a positive integer (e.g. 2, 4, 16, etc.).

This setting is only applicable when you are restoring from disc media and you have also included the **/v** option.

The maximum reading speed that is actually used is determined by whichever is *lower*: The **/cdrs**:***n*** value that you specify, or the speed deemed appropriate by the drive's firmware, according to the disc media in use. For example, if you are using media that is rated at 32X (for reading), the maximum reading speed will be no more than 32X, regardless of the setting you choose here. Similarly, if you supply a value that is invalid for or beyond the drive's design limits, the drive will automatically use the next-highest speed supported by both the drive and the media in use.

DVD speeds are approximately 1/8 CD speeds, so if you are using DVD discs, multiply the desired speed by 8 to determine the value to use here. For example, to obtain a maximum reading speed of 4X with a DVD, use **/cdrs**:***32***, since 8 × 4X = 32.

Default if omitted: Image for Windows uses the **Optimal** speed setting.

/iobs	IOBS=1

Include this option to try to improve I/O performance in cases where network or USB device performance is poor.

Default if omitted: Image for Windows does not use this option.

/err	AllowErrors=1

Use this option to tell Image for Windows to ignore read/write errors caused by bad sectors on the *target* drive during the restore operation. This parameter does not apply to bad sectors on the *source* drive.

Default if omitted: Image for Windows will notify you concerning the error and give you the option to continue or abort.

/noosn:n	N/A

This option controls how the OS is notified of partition changes. It's useful for full drive restores where your source and target drives are the same, but you're sure the restored partitions won't overlap the source (which will be deleted after the restore).

/noosn:1 - never send notification to OS about partition changes (a reboot must be used or corruption could occur if existing partitions existed where restored partitions are located). Most users will NOT want to use this option – it's for very advanced users only.

/noosn:2 – defer the notification until all partitions are restored. This option is safe for all to use.

Default if omitted: The OS is notified of partition changes as each partition is restored.

/irlm=n	N/A

Ignore restore locking mask. For example, to not care / ignore lock failures on drive G: you'd use: /irlm:64. Likewise A: would be /irlm:1, and G: and A: combined would be /irlm:65. This is an advanced option and typically used with the /noosn.

Default if omitted: Image for Windows does not ignore locking on restores.

/nlrm=n	N/A

No lock restore mask. For example, to not attempt a lock on drive G: you'd use: /nlrm:64. Likewise A: would be /nlrm:1, and G: and A: combined would be /nlrm:65.

This is an advanced option and typically used with the /noosn.

Default if omitted: Image for Windows attempts to lock all required drives on restores.

/ubi	UpdateBootIni=1

This option only applies if a copy of boot.ini exists in the root directory of the restored partition. If enabled, this option instructs Image for Windows to update all partition(n) references in the restored partition's boot.ini file, to accommodate a partition layout that differs from that of the original drive. Image for Windows will set all partition-based entries in the applicable boot.ini to point to the restored partition (but will not change file-based entries). This option has no effect when doing a full drive restore.

Default if omitted: Image for Windows does not try to update the boot.ini file.

/ubp	UpdateBootPart=1

This option updates any references to the restored partition in the active boot partition on the target drive. This is useful for situations where the boot partition differs from the system partition. However, you typically wouldn't want to use this option if you're creating a copy of an existing partition you want to keep, unless the target drive will be independent of the original drive. For this to be useful, the active boot partition should already be on the target drive or part of the same copy or restore operation.

Default if omitted: Image for Windows does not update the active boot partition.

/igpt	OSIgnoresGPT=1

Use this option when restoring to a GPT drive to indicate that the operating system being restored will not see the destination drive as GPT when booted. For example, an iMac using BootCamp or cases where the 0xEE placeholder partition is missing from the MBR. This option prevents Image for Windows from using GPT specific fix-up information on the drive after the restore.

Default if omitted: Image for Windows will use GPT specific fix-up information on GPT drives.

/wipe	Wipe=1

This option will wipe (zero-out) unused sectors in the restored partition(s) or drive, depending on the type of restore performed.

When restoring single partitions or when restoring multiple partitions to a drive with existing partitions, sectors located outside of the restored partition(s) are not wiped. If a partition is resized during the restore, the wiped area for that partition is the final size of the restored partition (not the size of the source partition).

When restoring a full drive or when restoring multiple partitions to a drive with no existing partitions, the entire drive is wiped, including all gaps between any partitions. Using this option provides an easy way to wipe a drive and restore in a single operation (such as when deploying images to used systems).

Default if omitted: Image for Windows will not perform any wiping of unused sectors.

/mp	MultiPass=1

Use this parameter to tell Image for Windows to use **Multi Pass** mode when restoring a differential or incremental backup. In **Multi Pass** mode, Image for Windows restores the full backup in one pass and then restores the differential backup in a second pass or incrementals in multiple passes. This setting is not applicable when restoring a full backup. You *must* use this option if the applicable full backup resides on removable media.

Default if omitted: Image for Windows uses **Single Pass** mode, restoring the full backup and the differential backup or incremental backups in one pass.

/cds	N/A

Use this parameter to tell Image for Windows to query all available CD/DVD/BD drives when trying to locate the appropriate source backup.

Default if omitted: You must explicitly specify the CD/DVD/BD drive that contains the source backup.

/mo	N/A

Instructs Image for Windows to display the following message immediately upon running:

Press the <space bar> for the menu interface or wait for the restore to start...

If you press the space bar while this message appears, Image for Windows will switch to interactive mode and wait for you to initiate the restore operation via the menu interface.

Default if omitted: The **Press the <space bar>…** message is not displayed and the restore operation proceeds using the command line.

/att	AlignToTarget=1

When restoring a full drive image, use this option to instruct Image for Windows to force alignment to the target drive regardless of the alignment used on the source drive. For example, if the **/a2k** option is also specified the restored drive will be aligned on 1MiB boundaries.

When restoring a single partition, specifying this option will instruct Image for Windows to not adjust the alignment (1MiB partition alignment will be used if the target has it already or not if it doesn't and a partition already exists).

Default if omitted: The alignment used on the target drive will be determined automatically based on the source drive.

/n2ka	N/A

By default, Image for Windows automatically uses 1MiB partition alignment when you restore from the command line and the backup contains 1MiB aligned partitions. Use this option to instruct Image for Windows not to automatically override normal cylinder-based alignment.

If you don't enable this option and Image for Windows determines that 1MiB partition alignment is needed, then Image for Windows enables both the Align2048 and the

AlignEndHS options for the restore.

Note: This option has been deprecated, but will remain supported for backwards compatibility. The **/att** option should be used instead.

Default if omitted. Alignment is automatically determined when restoring from the command line. When a single partition is being restored and **/a2k** is not used, Image for Windows will use 1MiB partition alignment if the destination drive contains a 1MiB aligned partition or cylinder alignment if the drive contains a partition which is not 1MiB aligned. Otherwise, the alignment used is obtained from the image being restored.

/aoe:*n*	AlignOnEnd=*n* Place under the [HDx] section

Use this option to instruct Image for Windows to align restored partitions at the end of a cylinder, or when the Align2048 option is enabled, end of a 1MiB boundary.

2 – Align on end by resizing

0 – Disable align on end

Default if omitted: Normal alignment (/aoe:1) is used.

/a2k	Align2048=1 Place under the [HDx] section

Use this option to instruct Image for Windows to align restored partitions based on 1MiB boundaries (drives with 512 byte sectors will be aligned on 2048 sectors; drives with 4096 byte sectors will be aligned on 256 sectors).

If this option is enabled then you will normally want to enable the AlignEndHS (/ahs) option and disable the AlignOnEnd (/aoe:0) option.

Default if omitted. Alignment is automatically determined when restoring from the command line. When a single partition is being restored and **/n2ka** is not used, Image for Windows will use 1MiB partition alignment if the destination drive contains a 1MiB aligned partition or cylinder alignment if the drive contains a partition which is not 1MiB aligned. Otherwise, the alignment used is obtained from the image being restored.

/av:*n*	AlignVal=*n* Place under the [HDx] section

This option allows you to specify a custom partition alignment value for restored partition(s). For example, to specify that partitions should be aligned on 2MiB boundaries, use /av:2M or AlignVal=2M. Invalid sizes will be ignored. This option overrides the other device alignment options.

Default if omitted. This option is not set (a custom alignment value will not be used).

/ahs	AlignEndHS=1 Place under the [HDx] section

Use this option to instruct Image for Windows to force a restored partition's ending head and sector values in the MBR to match the current geometry.

Default if omitted. The actual ending head and sector values are used.

/ahst	AlignHSOnTrunc=1 Place under the [HDx] section
Use this option to instruct Image for Windows to set a restored partition's head and sector values in the MBR to match the current geometry when it is located outside the range of the current geometry. Default if omitted. The actual ending head and sector values are used.	

/mg	UseMBRGeo=1 Place under the [HDx] section
Set this parameter to tell Image for Windows to use the geometry based on the MBR entry of the first partition in the backup image when restoring a backup. *Default if omitted*: Image for Windows uses the geometry of the target drive or the UseOrgGeo option.	

/mgv	UseValidMBRGeoOnly=1 Place under the [HDx] section
This option is used to ensure that the geometry from the MBR on the original system is aligned to known standards before accepting it for use. It only applies when /mg (UseMBRGeo) is used. *Default if omitted*: This option is disabled.	

/og	UseOrgGeo=1 Place under the [HDx] section
Set this parameter to tell Image for Windows to use, when restoring a backup, the original geometry of the source drive based on the environment used when the backup was created. *Default if omitted*: Image for Windows uses the geometry of the target drive.	

/c=*n*	c=*n* Place under the [HDx] section
Use this parameter in conjunction with /h and /s to manually specify the cylinder, head, and sector values for the target drive when you restore a backup image. This parameter specifies the last cylinder, and n is a number you supply. *Default if omitted*: Image for Windows uses the BIOS-reported values of the drive.	

/h=*n*	h=*n* Place under the [HDx] section
Use this parameter in conjunction with /c and /s to manually specify the cylinder, head, and sector values for the target drive when you restore a backup image. This parameter specifies the last head, and n is a number you supply. *Default if omitted*: Image for Windows uses the BIOS-reported values of the drive.	

/s=*n*	s=*n* Place under the [HDx] section
Use this parameter in conjunction with /c and /h to manually specify the cylinder, head, and sector values for the target drive when you restore a backup image. This parameter specifies the last sector, and n is a number you supply. *Default if omitted*: Image for Windows uses the BIOS-reported values of the drive.	

/gc	GeoCalc=*n* Place under the [HDx] section
Determine how a devices' geometry is obtained or calculated. 0=Default, 1=LBA, 2=Large, 3=Normal, 4=Bit-Shift, 5=Device Bit-Shift. *Default if omitted*: Default method is used.	

/rs:*n*	N/A
Use this parameter to resize a partition after restoring. *n* is the size in MiB's that you want to establish for the restored partition. If you try to use this parameter in conjunction with /x, the Expand option, /x overrides /rs. *Default if omitted*: Image for Windows restores the partition without resizing.	

/exlist:*n*	ExcludeList=*n*
This option will override the method used when excluded files/folders are restored (the backup image being restored must have been created with an exclusion list). The following values for *n* are supported: 0 – Excluded files are restored with their actual sizes, but contain whatever data is already on the drive (files are not wiped or zero-filled). 1 – Excluded files are deleted. Folders will not be deleted. 2 – Excluded files are truncated (files will exist, but all have a size of zero bytes). 3 – Excluded files and folders are deleted. This option does not delete base folders specified to keep in the exclusion list. *Default if omitted*: Image for Windows truncates or deletes the excluded files as specified in the exclusion list.	

/wco	WriteChangedSecsOnly=1
Use this option when restoring to write only the changed sectors to the target drive (target will be read to compare). Useful in cases where a large portion of the data is the same and it's desirable to reduce wear on the target drive (e.g. restoring image to SSD drive). *Default if omitted:* Image for Windows will write all restored sectors normally.	

/log:0	SaveLog=0
Disables logging.	

Default if omitted: Image for Windows logs during a restore operation.

Image for Windows Validate Options

In Table 7, you find the command line options that you must set to use Image for Windows to validate an image.

The table shows you both the command line option and the INI file variable. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Validate_Defaults] section, unless as noted otherwise.

Table 7: Image for Windows Required Validate Parameters

Command Line Option	INI Variable
/v	N/A
Use this option to indicate that you want to validate an image file. *Also required:* /CD*n* or a path name, as described below, to identify the location of the backup image you want to validate.	
/f	N/A
Use this option to specify the target drive letter, path, and file name for a backup file. It can also be used to connect to a multicast server.	
/f:x:\filename /f:x:\mypath\filename /f:"x:\my path\file name" Or: /f:d@p:\filename /f:d@p:\mypath\filename /f:"d@p:\my path\filename" /f:#ntsig@p:\mypath\filename /f:{GUID}@p:\mypath\filename	*x:*\ is target drive letter *mypath* or *my path* is path to filename *filename* is target file name for image Or: Specify target device, partition, path, and file name: d is target hard drive number p is target partition ID (hex or decimal notation) # – NT Disk Signature Follows {GUID} – GPT Disk GUID *mypath* or *my path* is path to filename *filename* is target file name for image Device modifiers may be used as needed. When used, they must be placed after the **/f:** and before the target hard drive number: w – Windows device

	o – Optical drive (when you combine this option with the option mentioned above, this option must come last). Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of quotes.
/f:\\\server*port*sessionname*password *Examples:* /f:\\\192.168.0.16*** /f:"\\\OfficeServer**Win8 Clean*pswd"	Used to connect to a multicasting server. Use quotes if any of the values contain a space. Default values will be used for port, sessionname, and password if not specified. server – Specify the system running the multicasting server. port – Specify the port to use. The default is port 54312. sessionname – Specify the session name. No session name is used if omitted. password – Specify the password for the session. Omit if no password is required.

In Table 8, you find the command line parameters that you might want to use with Image for Windows when validating an image.

The table shows you both the command line option and the INI file variable. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Validate_Defaults] section, unless as noted otherwise.

Table 8: Image for Windows Optional Validation Parameters

/noej	NoEject=1
Use this parameter to tell Image for Windows never to automatically open the optical drive tray. *Default if omitted*: Image for Windows will automatically open the optical drive tray whenever a new disc is needed and at the completion of the validate operation.	

/cdrs:*n*	CDReadSpeed=*n*
Use this setting to specify the *maximum* disc reading speed that Image for Windows will use when reading disc media (CD/DVD/BD) during validation, with *n* being a positive integer (e.g. 2, 4, 16, etc.). This setting may be used to force a lower reading speed than that automatically used by the optical drive's firmware. Slower reading speeds may	

increase reliability.

n should be a positive integer (e.g. 2, 4, 16, etc.).

This setting is only applicable when you are validating an image stored on disc media.

The maximum reading speed that is actually used is determined by whichever is *lower*: The ***/***cdrs:***n*** value that you specify, or the speed deemed appropriate by the drive's firmware, according to the disc media in use. For example, if you are using media that is rated at 32X (for reading), the maximum reading speed will be no more than 32X, regardless of the setting you choose here. Similarly, if you supply a value that is invalid for or beyond the drive's design limits, the drive will automatically use the next-highest speed supported by both the drive and the media in use.

DVD speeds are approximately 1/8 CD speeds, so if you are using DVD discs, multiply the desired speed by 8 to determine the value to use here. For example, to obtain a maximum reading speed of 4X with a DVD, use ***/***cdrs:***32***, since 8 × 4X = 32.

Default if omitted: Image for Windows uses the **Optimal** speed setting.

/iobs	IOBS=1

Include this option to try to improve I/O performance in cases where network or USB device performance is poor.

Default if omitted: Image for Windows does not use this option.

/mp	MultiPass=1

Use this parameter to tell Image for Windows to use **Multi Pass** mode when validating a differential or incremental backup. In **Multi Pass** mode, Image for Windows validates the full backup in one pass and the differential backup in a second pass or incrementals in multiple passes. This setting is not applicable when validating a full backup. This option *must* be used if the applicable full backup resides on removable media.

Default if omitted: Image for Windows uses **Single Pass** mode, validating in one pass.

/base	N/A

Note: Beginning with Image for Windows 2.78 this parameter is optional when validating a differential or incremental backup and should normally be omitted. Instead, use the **/sch** option if it's necessary to specify the location of any of the base images.

Use when validating a differential or incremental backup to identify the base backup Image for Windows should use to validate the backup.

/base:x:\bkup	*x:*\ is source drive letter
/base:x:\mypath\bkup	mypath or my path is path to bkup
/base:"x:\my path\bkup"	*bkup* is name of existing base backup (omit file extension)
Or:	Or:
/base:d@p:\bkup	Specify source device, partition, path, and file name:
/base:d@p:\mypath\bkup	
/base:"d@p:\my path\bkup"	

/base:#ntsig@p:\mypath\bkup /base:{GUID}@p:\mypath\bkup	d is source hard drive number p is source partition ID (hex or decimal notation) # – NT Disk Signature Follows {GUID} – GPT Disk GUID You can use device modifiers as needed. When you use them, you must place them after the **/base:** and before the source hard drive number: w – Windows device o – Optical drive (when you combine this option with the option mentioned above, this option must come last). Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of quotes.

/sch:*"path"*	N/A

Use this parameter to specify the search paths Image for Windows uses when looking for base images in the backup chain. *path* can use the *d@p:\path* format to specify the drive and partition id.

This option can be used multiple times to specify multiple search paths (e.g. when the images in the backup chain are not all stored in the same folder).

Examples (commands should be on one line):

```
imagew /v /f:"E:\Backups\Win8System - Inc D" /sch:"E:\Backups"
/sch:"E:\Backups\Archive"
```

```
imagew /v /f:"w1@0x2:\Images\WinXP Drive - Inc E"
/sch:"w1@0x2:\Images" /sch:"w1@0x2:\Images\Full"
```

Default if omitted: Image for Windows searches only the folder of the specified image for base images in the backup chain.

/pw:*mypassword* or /pw:*"my password"*	N/A

Use this parameter to supply the password needed to decrypt a backup that you encrypted and/or password protected when you created it. If your password contains embedded spaces, place quotation marks around it.

This option can be specified multiple times as required by the backup image chain (base + differential/incrementals).

Default if omitted: Image for Windows does not supply a password.

/log:0	SaveLog=0

Disables logging.

Default if omitted: Image for Windows logs during a validate operation.

Image for Windows Copy Options

In Table 9, you find the command line options that you can set to use Image for Windows to make a copy of a partition or drive.

The table shows you both the command line option and the INI file variable. In some instances, both forms of the parameter are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Copy_Defaults] section.

Table 9: Image for Windows Required Copy Parameters

Command Line Option	INI Variable
/copy	N/A
Use this option to indicate that you want to perform a copy.	
/sd	N/A
Use this option to identify the source hard drive and partition. For most users, the partition ID will be a number from 1 through 4. For partition IDs of 9 or below, you can use a single digit in place of hexadecimal notation (e.g. 1 is equivalent to 0x1, and 5 is equivalent to 0x5). The volume ID will be a number formatted as 0x*PVV*, where *P* is the extended partition and *VV* is the volume number in hexadecimal from 01 to FF. If you are not sure of the partition or volume ID number, run Image for Windows using the interface, choose the Backup option, and click Next. The screen that lists the partitions and volumes also will display the ID in parentheses as a hexadecimal number. You should prefix that number with a 0x on the command line.	
/sd:d@p /sd:wd@p /sd:?D: /sd:#ntsig@p /sd:{GUID}@p	d is the source hard drive number p is the source partition or volume ID (hex or decimal notation), depending on whether you are referring to a partition or a volume. D: is the source drive letter. # – NT Disk Signature Follows {GUID} – GPT Disk GUID You can use device modifiers as needed. When you use them, you must place them after the **/sd:** and before the source hard drive number: w – Windows device.

	v – Virtual drive. ? – Drive letter follows.

/td	N/A
Use this option to identify the target hard drive and partition. For most users, the partition ID will be a number from 1 through 4. For partition IDs of 9 or below, you can use a single digit in place of hexadecimal notation (e.g. 1 is equivalent to 0x1, and 5 is equivalent to 0x5). The volume ID will be a number formatted as 0x*PVV*, where *P* is the extended partition and *VV* is the volume number in hexadecimal from 01 to FF. If you are not sure of the partition or volume ID number, run Image for Windows using the interface, choose the Backup option, and click Next. The screen that lists the partitions and volumes also will display the ID in parentheses as a hexadecimal number. You should prefix that number with a 0x on the command line.	
/td:d@p /td:wd@p /td:?D: /td:#ntsig@p /td:{GUID}@p	d is the target hard drive number p is the target partition or volume ID (hex or decimal notation), depending on whether you are referring to a partition or a volume. D: is the target drive letter. # – NT Disk Signature Follows {GUID} – GPT Disk GUID You can use device modifiers as needed. When you use them, you must place them after the **/td:** and before the target hard drive number: w – Windows device. v – Virtual drive. ? – Drive letter follows.

The above options are required when you perform a copy using Image for Windows from the command line. In Table 10, you find a list of the optional copy parameters you can use when you run Image for Windows from the command line.

The table shows you both the command line option and the INI file variable. In some instances, both forms of the options are available; in other cases, only one is available. When one form of an option isn't available, N/A appears. To set up an INI file, place these parameters in the [Copy_Defaults] section.

Table 10: Image for Windows Optional Copy Parameters

Command Line Option	INI Variable
/raw	RawMode=1

Set this parameter to force Image for Windows to use raw mode, which copies all sectors, rather than just used sectors, even for recognized file systems.

Default if omitted: Image for Windows copies only used sectors backed up for recognized file systems and uses raw mode automatically for unrecognized file systems.

/skp:0	SkipPageFile=0

Set this parameter to instruct Image for Windows to include the page files (`pagefile.sys`, `swapfile.sys`) in the copy.

Default if omitted: Image for Windows skips the page file data.

/skh:0	SkipHiberFile=0

Set this parameter to instruct Image for Windows to include the hibernation file (`hiberfil.sys`) in the copy.

Default if omitted: Image for Windows skips the hibernation file data.

/o	N/A

Use this option to tell Image for Windows to overwrite the target without first prompting for confirmation.

Default if omitted: Image for Windows prompts before overwriting the target.

/clr	N/A

Use this option to have Image for Windows clear the MBR and EMBR prior to copying.

Default if omitted: Image for Windows does not clear the MBR and EMBR.

/rb:n	N/A

Use this option to have Image for Windows reboot, shutdown, suspend, or hibernate the system after copying. The value n can be 1 to reboot with all prompts, 2 to reboot with completion message, but without reboot message (error does not cancel reboot), 4 to reboot without completion message or reboot message (error cancels reboot), 8 to shutdown, 16 to suspend (sleep), or 32 to hibernate. If the specified option is not supported by the system the next one will be used in the following order: suspend, hibernate, shutdown. If suspend or hibernate is requested and a shutdown or reboot is required, a shutdown is performed instead.

Default if omitted: Image for Windows attempts to determine if the computer needs to be rebooted after copying and, if so, prompts you to reboot.

/fd	ForceDismount=1

Use this option to force dismounting a volume (partition) that can't be locked for copy. Using this option will invalidate all opened handles to the volume, which may result in lost data. Image for Windows will attempt to lock the volume after forcing the dismount.

Default if omitted: Normal locking without forcing a dismount occurs.

/sig	ReplaceNTSig=1

Use this option if you are copying a partition that Windows had assigned a drive letter before you copied the drive. If you use this option, Image for Windows will copy the disk signature associated with the source partition.

Note: The disk GUID of a target GPT drive will not be changed.

Default if omitted: Image for Windows will use the disk signature already present in the MBR of the target drive, or, if none exists, Image for Windows will create one.

/csig	ChangeNTSig=1

When copying a full drive, this option allows you to change the NT Signature copied to the target drive. For target GPT drives, the MBR NT Signature, the GPT Disk GUID, and the partition GUIDs will all be changed. This can be useful if you plan on having both the original and copied hard drive in the same computer at the same time while running Windows; otherwise Windows may detect the duplicate signature and modify it which may (depending on the OS) prevent the copied hard drive from booting properly.

When copying single or multiple partitions to a GPT drive, this option will change the GUID of each partition copied.

To retain the existing signature used by the target drive also specify the **/csigut** option.

Default if omitted: Image for Windows will not change the copied disk signature, drive GUIDs, or partition GUIDs.

/chgvsn	ChgVolSN=1

Use this option to change the file system volume ID/serial number of copied FAT//FAT32/NTFS/HPFS partitions and the UUID of Ext2/3/4 partitions.

Default if omitted: The file system volume ID/serial number or UUID is not changed.

/nvn:"*name*"	NewVolumeName=*name*

Use this option to specify the new volume name (label) for the copied partition. If multiple partitions are being copied they will all be set to the specified name.

For example:

```
imagew /copy /sd:w0@0x3 /td:w3@0x4 /nvn:"Win8 Copy"
```

Default if omitted: The volume name will not be changed from its copied value.

/ohd	UseOrgHDNum=1

Use this option to tell Image for Windows to keep references to the source hard drive number intact within the partition after Image for Windows has copied the partition to the target drive. This option is primarily used for Linux partitions.

Default if omitted: If the target drive number differs from that of the source drive, Image for Windows will update applicable drive references residing within the copied partition to reflect the new hard drive number.

/a	SetActive=1

Use this parameter to make the partition you copy active.

Default if omitted: Image for Windows does not make the copied partition active unless no other partitions are active and the target partition is on HD0.

/t	WriteMBR=1

Use this parameter to have Image for Windows install standard MBR code after completing the copy operation. Standard MBR code is the code that boots the active partition.

Default if omitted: Image for Windows does not write standard MBR code unless the MBR is empty.

/e	UseSameMBREntry=1

Use this parameter to have Image for Windows move the partition table entry of the copied partition to the same location in the master partition table as it appeared on the source drive.

Default if omitted: Image for Windows does not move the partition table of the copied partition.

/ms:n	N/A

Use this parameter to have Image for Windows move the partition table entry of the restored partition to a given slot in the MBR. The value n is 0 to 3. This option is only applicable when restoring a single partition.

Default if omitted: Image for Windows does not move the partition table of the restored partition.

/embrid:n	N/A

This parameter is used to set a specific ID value to the copied partition if an EMBR exists. The ID is only used if not already in use by another partition. To assume the same ID as a partition being overwritten use, the value zero for n.

Default if omitted: Image for Windows uses the copied partitions original id.

/gpt	N/A

Instruct Image for Windows to create a GPT on the target drive. Note that restoring first track overrides this option. This is mainly used with the /clr option to ensure the full size of the drive that is greater than 2TiB is accessible. You can also provide an option /nomsr if the GPT to be created should not have a Microsoft Reserved Partition created on it. While Image for Windows supports a GPT, it does not currently officially support an EFI based system.

Default if omitted: Image for Windows does not create a GPT on the drive.

/rft	RFT=1

Use this parameter to have Image for Windows copy the first track when it copies the partition. Copying the first track may also change the disk type (MBR/EMBR/GPT) of the destination drive if it doesn't match that of the source drive (the copy will abort if the

change is required and cannot be applied).

Default if omitted: Image for Windows does not copy the first track.

/fts:*n*	RFTS=*n*

Use this option to specify how many sectors of the first track of the hard drive Image for Windows should copy. Use 0 to indicate the entire track

Default if omitted: Image for Windows determines the number of tracks needed to copy.

/stt	Scale=1

For NTFS/FAT/FAT32/EXT 2/3/4 partitions, use this parameter to tell Image for Windows to resize each copied partition proportionally, so that each partition takes up the same relative amount of space on the target drive as it did on the source drive. Unpartitioned free space that existed on the source drive at the time of the backup will still exist at the end of the target drive after Image for Windows completes the copy operation.

This option only applies when you copy an entire hard drive;

Default if omitted: Image for Windows does not scale each copied partition.

/x	Expand=1

For NTFS/FAT/FAT32/EXT 2/3/4 partitions, when copying to a target that is larger than the source partition, use this parameter to have Image for Windows expand the partition after completing the copy operation.

This option is equivalent to the “Scale to Fit” option for fully copying drives.

Default if omitted: Image for Windows will not expand the partition, and free space will remain after Image for Windows completes the copy operation.

/kf:*n*	KeepFree=*n*

Use this parameter if you also use either **/x** or **/stt** to specify the amount of space, in mebibytes (MiB), that Image for Windows should leave free.

Default if omitted: Image for Windows will fill the entire available area.

/m	FirstFit=1

Use this parameter to tell Image for Windows to choose the target area automatically, based on the first area of available free space large enough to accommodate the partition you want to copy.

Default if omitted: You must explicitly specify the target area.

/last	LastFit=1

Use this parameter to have Image for Windows place the copied partition at the top of the last free block large enough (e.g. restore to the end of the drive). This option is valid only when copying a single partition and doesn’t support resizing.

Default if omitted: Image for Windows will copy the partition normally toward the start of the drive or free space area.

/vb	PostValidate=1

Use this parameter to have Image for Windows check that each byte from the source drive was copied to the target drive properly.

Default if omitted: Image for Windows does not validate the copied data.

/err	AllowErrors=1

Use this option to tell Image for Windows to ignore read/write errors caused by bad sectors on the source or target drive during the copy operation.

Default if omitted: Image for Windows will notify you concerning the error and give you the option to continue or abort.

/noosn:n	N/A

This option controls how the OS is notified of partition changes.

/noosn:1 - never send notification to OS about partition changes (a reboot must be used or corruption could occur if existing partitions existed where restored partitions are located). Most users will NOT want to use this option – it's for very advanced users only.

/noosn:2 – defer the notification until all partitions are copied. This option is safe for all to use.

Default if omitted: The OS is notified of partition changes as each partition is copied.

/ubi	UpdateBootIni=1

This option only applies if a copy of boot.ini exists in the root directory of the copied partition. If enabled, this option instructs Image for Windows to update all partition(n) references in the restored partition's boot.ini file, to accommodate a partition layout that differs from that of the original drive. Image for Windows will set all partition-based entries in the applicable boot.ini to point to the copied partition (but will not change file-based entries). This option has no effect when doing a full drive copy.

Default if omitted: Image for Windows does not try to update the boot.ini file.

/wipe	Wipe=1

This option will wipe (zero-out) unused sectors in the copied partition(s) or drive, depending on the type of copy performed.

When copying single partitions or when copying multiple partitions to a drive with existing partitions, sectors located outside of the copied partition(s) are not wiped. If a partition is resized during the copy, the wiped area for that partition is the final size of the copied partition (not the size of the source partition).

When copying a full drive or when copying multiple partitions to a drive with no existing partitions, the entire drive is wiped, including all gaps between any partitions. Using this option provides an easy way to wipe a drive and copy to it in a single operation.

Default if omitted: Image for Windows will not perform any wiping of unused sectors.

/att	AlignToTarget=1

When copying an entire drive, use this option to instruct Image for Windows to force alignment to the target drive regardless of the alignment used on the source drive. For example, if the **/a2k** option is also specified the restored drive will be aligned on 1MiB boundaries.

When copying a single partition, specifying this option will instruct Image for Windows to not adjust the alignment (1MiB partition alignment will be used if the target has it already or not if it doesn't and a partition already exists).

Default if omitted: The alignment used on the target drive will be determined automatically based on the source drive.

/n2ka	N/A

By default, Image for Windows automatically uses 1MiB partition alignment when you copy from the command line and the source contains 1MiB aligned partitions. Use this option to instruct Image for Windows not to automatically override normal cylinder-based alignment.

If you don't enable this option and Image for Windows determines that 1MiB partition alignment is needed, then Image for Windows enables both the Align2048 and the AlignEndHS options for the restore.

Note: This option has been deprecated, but will remain supported for backwards compatibility. The **/att** option should be used instead.

Default if omitted. Alignment is automatically determined when copying from the command line.

/aoe:*n*	AlignOnEnd=*n* Place under the [HDx] section

Use this option to instruct Image for Windows to align copied partitions at the end of a cylinder, or when the Align2048 option is enabled, end of a 1MiB boundary.

2 – Align on end by resizing

0 – Disable align on end

Default if omitted: Normal alignment (/aoe:1) is used.

/a2k	Align2048=1 Place under the [HDx] section

Use this option to instruct Image for Windows to align copied partitions based on 1MiB boundaries (drives with 512 byte sectors will be aligned on 2048 sectors; drives with 4096 byte sectors will be aligned on 256 sectors).

If this option is enabled then you will normally want to enable the AlignEndHS (/ahs) option and disable the AlignOnEnd (/aoe:0) option.

Default if omitted. The alignment is based on cylinders.

/av:*n*	AlignVal=*n* Place under the [HDx] section

This option allows you to specify a custom partition alignment value for copied partition(s). For example, to specify that partitions should be aligned on 2MiB boundaries, use /av:2M or AlignVal=2M. Invalid sizes will be ignored. This option overrides the other device alignment options.

Default if omitted. This option is not set (a custom alignment value will not be used).

/ahs	AlignEndHS=1 Place under the [HDx] section

Use this option to instruct Image for Windows to force a copied partition's ending head and sector values in the MBR to match the current geometry.

Default if omitted. The actual ending head and sector values are used.

/ahst	AlignHSOnTrunc=1 Place under the [HDx] section

Use this option to instruct Image for Windows to set a copied partition's head and sector values in the MBR to match the current geometry when it is located outside the range of the current geometry.

Default if omitted. The actual ending head and sector values are used.

/mg	UseMBRGeo=1 Place under the [HDx] section

Set this parameter to tell Image for Windows to use the geometry based on the MBR entry of the first partition on the source drive.

Default if omitted: Image for Windows uses the geometry of the target drive or the UseOrgGeo option.

/og	UseOrgGeo=1 Place under the [HDx] section

Set this parameter to tell Image for Windows to use the original geometry of the source drive based on the environment being used to copy.

Default if omitted: Image for Windows uses the geometry of the target drive.

/c=*n*	c=*n* Place under the [HDx] section

Use this parameter in conjunction with /h and /s to manually specify the cylinder, head, and sector values for the target drive when you copy. This parameter specifies the last cylinder, and n is a number you supply.

Default if omitted: Image for Windows uses the BIOS-reported values of the drive.

/h=*n*	h=*n* Place under the [HDx] section

Use this parameter in conjunction with /c and /s to manually specify the cylinder, head, and sector values for the target drive when you copy. This parameter specifies the last

head, and n is a number you supply.

Default if omitted: Image for Windows uses the BIOS-reported values of the drive.

/s=*n*	s=*n* Place under the [HDx] section

Use this parameter in conjunction with /c and /h to manually specify the cylinder, head, and sector values for the target drive when you copy. This parameter specifies the last sector, and n is a number you supply.

Default if omitted: Image for Windows uses the BIOS-reported values of the drive.

/rs:*n*	N/A

Use this parameter to resize a partition after copy. *n* is the size in MiB's that you want to establish for the copied partition. If you try to use this parameter in conjunction with /x, the Expand option, /x overrides /rs.

Default if omitted: Image for Windows copies the partition without resizing.

/nt	NoTRIM=1

Reduces the amount of caching required for the source drive on systems with TRIM enabled by disabling TRIM during the copy operation. When TRIM is enabled the original contents of deleted sectors must be cached, whereas a normal delete doesn't overwrite the sectors and instead just updates the directory entry. **Note:** If the operation doesn't complete (due to reboot, shutdown, process forced to end, etc.) TRIM will stay disabled until enabled using the Windows fsutil program (`fsutil behavior set DisableDeleteNotify 0`). If IFW completes the operation, even with errors reported, TRIM will be properly reset to the enabled state.

Default if omitted: Image for Windows does not disable TRIM during a copy operation.

/exlist=*filename*	N/A

IMPORTANT NOTE: This option is used at your own risk. Be aware that you're not getting a complete image copy.

This option allows you to specify a file which contains a list of paths and/or files to exclude when copying. The file must be ANSI text and located on the local file system. FAT, FAT32, and NTFS file systems are supported (the option will be ignored for other file systems).

The data of the excluded files is not copied – the files will either be deleted or truncated (depending on the options selected). Note that even though excluded, the data will still affect the minimum space required to copy (just as if it wasn't excluded).

Each line in the exclusion file should be in the following format:

`[options]path >`

Valid `options` are:

`f` - Exclude files only. Do not delete folders. If not specified, folders will be deleted.

t - Truncate files instead of deleting them. Folders will not be deleted. Files will have a size of zero bytes.

k - Keep the base folder. If not specified, the base folder will be deleted.

The `path` can be complete to exclude a specific folder (e.g. `\Games`) or you can use wildcards (*, ?) to specify matching files. When excluding a folder, use a trailing backslash (\ ) to indicate a folder is specified (otherwise, a search will be made for matching files). Do not surround the path with quotes even if it includes spaces. Do not specify a drive letter.

To also exclude files from subdirectories (apply recursion), include the > (greater than) character after the path.

Examples:

```
[t]*.jpg          - exclude all *.jpg files in the root folder, files will be truncated
\*.iso            - exclude all *.iso files in the root folder
\Backups\*.tbi    - exclude all *.tbi files in the \Backups folder
[k]\Games\ >      - exclude the \Games folder and all sub-folders, keep
                    the \Games folder (use trailing backslash to indicate folder)
\Work\Archive\    - exclude the \Work\Archive folder, sub-folders not excluded
                    (use trailing backslash to indicate folder)
*.jpg >           - exclude all *.jpg files in the root folder and all sub-folders
[f]\Movies\*.mpg >  - exclude all *.mpg files in the \Movies folder and all
                      sub-folders, folders will not be deleted
\ISO Files\Old\*.iso >  - exclude all *.iso files in \ISO Files\Old folder and all
                          sub-folders
```

Default if omitted: Image for Windows includes all files when copying the partition (the page file and hibernation file will be included or excluded per their respective options).

/wco	WriteChangedSecsOnly=1

Use this option when copying to write only the changed sectors to the target drive (target will be read to compare). Useful in cases where a large portion of the data is the same and it's desirable to reduce wear on the target drive (e.g. copying partition to SSD drive).

Default if omitted: Image for Windows will write all copied sectors normally.

/log:0	SaveLog=0

Disables logging.

Default if omitted: Image for Windows logs during a copy operation.

Image for Windows List Options

Table 11 lists the List parameters you can use when you run Image for Windows from the command line. There are no INI file variable equivalents for these parameters – they are only valid on the command line.

Table 11: Image for Windows List Parameters

Command Line Option	INI Variable
/L	N/A

Use this option to indicate that you want to list the drives and partitions on the system or those contained in a backup image file.

Output must be redirected to a file for viewing when using *Image for Windows* (imagew.exe). Output can be redirected or viewed onscreen when using *Image for Windows (Console)* (imagewc.exe).

Example 1: `imagew /l /d:0 /stdout:output.txt`

In this example, `/d:0` identifies hard drive 0 as the drive for which you want to list partitions and `/stdout:output.txt` indicates Image for Windows will save the output to the file output.txt.

Example 2: `imagewc /l /all`

In this example, a detailed report of all drives and partitions will be shown onscreen.

/d:*n*	N/A

Specifies the drive for which you want to list the partitions, where *n* = the drive number.

Default if omitted: All drives and partitions are listed.

/opt	N/A

List optical drives. Includes drive number and name. Hard drives will not be listed.

Default if omitted: Optical drives are not listed.

/fs	N/A

Include “free space” available for each partition in listing. This option has no affect when used with **/all** or **/f**.

Default if omitted: The amount of “free space” is not listed.

/all	N/A

Specify to produce a more detailed report. In addition to the basic information, it includes:

- Hard drive BIOS Device number, number of Sectors, Sector Size, and CHS values.
- Partition Start LBA, End LBA, FS ID, PE Flag, Free Sectors, Used Sectors, Last Used Sector, MBR Entry number, MBR End CHS, and MBR Flag.
- When used with **/f**, additional “Data Info” is listed, the base image filename is listed for differential/incremental images, and the file exclusion list (if any) is listed.

Default if omitted: Only the basic information is listed.

/f	N/A

List backup image drive and partition information from the specified backup image file. Use with **/all** to obtain more details. It is not necessary to include the .TBI extension with the file name. The image file description is listed if one exists.

When **/all** is not specified, no drive information is displayed and the partition information is limited to the name, size, file system, and ID.

Example:

```
imagew /l /all /f:"e:\backups\my backup" /stdout:output.txt
```

In this example, detailed drive and partition information from the backup image file `e:\backups\my backup.tbi` will be saved in `output.txt`.

Default if omitted: Physical drives and partitions are listed.

Image for Windows Combine Options

Table 12 lists the Combine parameters you can use when you run Image for Windows from the command line.

Table 12: Image for Windows Combine Parameters

Command Line Option	INI Variable
/combine	N/A

Use this command to combine a differential or incremental images of a backup chain into a single image file. The newly created image is a full image and can be used as the base image for future differential or incremental backups.

The **/f** parameter is used to specify the file name of the new image file. Use the **/base** parameter to specify the starting file to combine (all files from the this file back to the original base file will be combined).

Optionally, you can specify the **/hash** option to automatically create the hash file for the new image file. To remove the combined files, specify the **/del** option to delete the original image files combined after the process has finished (deleting the files will render any remaining incrementals in the chain unusable).

In the following examples, a full backup has been created followed by five incremental backups:

```
E:\Backups\Win7 Full.tbi
E:\Backups\Win7 Inc 1.tbi
E:\Backups\Win7 Inc 2.tbi
E:\Backups\Win7 Inc 3.tbi
E:\Backups\Win7 Inc 4.tbi
E:\Backups\Win7 Inc 5.tbi
```

Running the following command will combine all five incremental backups and the base full into a new backup image named *Win7 Current*. The existing incremental files will not be deleted and a hash file will not be created for the new backup file. (The command should be on one line.)

```
imagew /combine /f:"E:\Backups\Win7 Current"
```

```
/base:"E:\Backups\Win7 Inc 5"
```

Restoring *Win7 Current* would be the same as restoring *Win7 Inc 5*.

Running the following command will combine only the first three incremental backups and the base full into a new backup image named *Win7 Base3*. Additionally, the original combined files will be deleted and a hash file will be created for the new backup file. (The command should be on one line.)

```
imagew /combine /f:"E:\Backups\Win7 Base3" /base:"E:\Backups\Win7 Inc 3" /del /hash
```

Restoring *Win7 Base3* would be the same as if you restored *Win7 Inc 3*. Since the files *Win7 Full* through *Win7 Inc 3* were deleted, the remaining incremental files (*Win7 Inc 4* & *Win7 Inc 5*) are now unusable.

/f	N/A
Use this option to specify the target drive letter, path, and file name for the combined backup file.	
/f:x:\filename	*x:*\ is target drive letter
/f:x:\mypath\filename	*mypath* or *my path* is path to filename
/f:"x:\my path\file name"	*filename* is target file name for image
Or:	Or:
/f:d@p:\filename	Specify target device, partition, path, and file name:
/f:d@p:\mypath\filename	d is target hard drive number
/f:"d@p:\my path\filename"	p is target partition ID (hex or decimal notation)
/f:#ntsig@p:\mypath\filename	# – NT Disk Signature Follows
/f:{GUID}@p:\mypath\filename	{GUID} – GPT Disk GUID
	mypath or *my path* is path to filename
	filename is target file name for image
	Device modifiers may be used as needed. When used, they must be placed after the **/f:** and before the target hard drive number:
	w – Windows Device
	o – Optical drive (when you combine this option with the option mentioned above, this option must come last)
	v – Virtual drive
	Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of

	quotes. o can be use with a, u, f, and s

/base	N/A
This parameter specifies the starting image file to combine. All image files in the chain from this file back to the original base file will be combined.	
/base:x:\bkup /base:x:\mypath\bkup /base:"x:\my path\bkup" Or: /base:d@p:\bkup /base:d@p:\mypath\bkup /base:"d@p:\my path\bkup" /base:#ntsig@p:\mypath\bkup /base:{GUID}@p:\mypath\bkup	*x:*\ is source drive letter mypath or my path is path to bkup *bkup* is name of existing backup (omit file extension) Or: Specify source device, partition, path, and file name: d is source hard drive number p is source partition ID (hex or decimal notation) # – NT Disk Signature Follows {GUID} – GPT Disk GUID You can use device modifiers as needed. When you use them, you must place them after the **/base:** and before the source hard drive number: w – Windows Device o – Optical drive v – Virtual drive Whether using drive letter or device/partition, you may specify any path desired. Paths and/or file names with imbedded spaces require the use of quotes.

/del:*n*	N/A
Use this option to remove the combined files. After the combine process has finished, the original image files will be deleted. Deleting the files will render any remaining incrementals in the chain unusable. Use **/del:1** (or **/del**) to delete all the original image files. Use **/del:2** to delete all except the base (full) image file. *Default if omitted*: The original image files will not be deleted.	

	N/A
The following backup parameters can optionally be used when combining images:	

/comp - select compression
/enc - encryption and/or password protection
/noej - don't auto-open optical drive tray
/iobs - adjust I/O performance
/desc - specify image description
/bc - backwards compatible
/md - auto-create target path
/v - validate image
/max - specify maximum file size
/log - logging
/hash - create hash file to speed up differential/incremental backups
/sch - search path(s) for base or incremental images
/pw - specify password(s)

For more information on the syntax of a specific option please refer to the *Image for Windows Backup Options* section on page 152.

Troubleshooting

If you should encounter any problems while running Image for Windows, please visit our on-line support page at http://www.terabyteunlimited.com/support-image-for-windows.htm.

The Image for Windows log file and the Windows event log can also provide useful information to resolve issues. By default, the log file (IFW.LOG) is saved in the Image for Windows installation folder.

The Windows Event Viewer can be used to access the Image for Windows event log entries (located in *Windows Logs* | *Application*). The following events and categories are logged:

Event ID: 257 (Information), 258 (Warning), 259 (Error)

Task Category: None (0), Backup (1), Restore (2), Validate (3), Licensing (4), Copy (5)

Use the `/evlogl` command line parameter or the `EventLogLevel` INI file variable to adjust the level of logging. By default, Image for Windows will log errors, warnings, and start/stop status.

Appendix A: Understanding the Types of Backups

Many software packages create file-based backups, while Image for Windows creates a sector-based backup. This section describes both types of backups and their differences.

File-Based Backup

When you create a file-based backup, you copy files from one storage location to another using a third-party software package, the built in Microsoft backup utility or by dragging-and-dropping files and/or folders using Windows Explorer.

Creating a file-based backup is simple, and you can backup or restore only certain files or folders. But, a file-based backup it has drawbacks. For example, files that are in use may not be backed up. And, restoring a file-based backup can be tricky:

Files in use cannot be restored.

If the required operating system environment and software is not installed and accessible, you will first need to install it before you can restore any data.

Sector-Based Backup

A sector-based backup, also called *imaging*, differs from file-based backup because imaging operates on the entire partition, including all files and the operating system itself. This is the method of backup employed by Image for Windows.

When you create a sector-based image as your backup, you back up not only your data files but also the operating system, in its entirety. If you restore a sector-based backup, your computer returns to the state it was in when you created the image. Image for Windows places all information on the target drive in the exact location where it appeared when you created the image.

In addition, you can:

* Restore a sector-based backup even if the operating system isn't accessible—effectively performing a bare-metal restoration.

* Restore individual files, if you want, using the free TBIView or TBIMount add-ons.

Appendix B: Backup Strategies

Whether you create file-based backups or sector-based backups, you can choose between three different backup methods:

* Full Backups
* Incremental Backups
* Differential Backups

In this section, you will find information that explains each of these backup methods. The backup method you choose actually affects you most when you need to restore the backup; some backups are easier to restore than others.

In addition to understanding backup methods, it's also important to store your backup media in a safe, secure location. We strongly recommend that you store your backup media in a different physical location than your computer and that you place your backup media in a fire-proof safe designed for media. By storing your backup media offsite, you don't run the risk of losing both your computer and your backups in the event of fire or theft. By storing your backups in a fire-proof safe designed for media, your backups will be protected if a fire occurs at the location where you store your backups.

Note: Be sure to use a fire-proof safe designed for media because, while paper doesn't burn until 451 degrees Fahrenheit, media will melt. Computer media may be damaged at temperatures above 125 degrees Fahrenheit and 80% humidity.

Full Backups

A full backup, as the name implies, involves backing up all specified data.

How Often Should I Back Up?

We hear this question a lot, and there is no right answer. Instead, there is the answer that works best for you. To figure out how often to back up, ask yourself, "How much data am I willing to re-enter?" because, once you restore your latest backup, you will need to re-enter all information since you made that backup. Many people do not want to re-enter any information, so they back up daily. Others feel their computer usage is such that they are willing to back up once each week and re-enter up to seven days worth of data. Decide how much data you are willing to re-enter and set your backup schedule accordingly.

Incremental Backups

Incremental backups include only data that has changed since the *most recent backup* was performed—whether the most recent backup was a full backup or a previous incremental backup. To use this backup method, you perform a full backup at an interval of your choice—say every two weeks. In between full backups, you

perform incremental backups. If you need to restore your entire system, you need to restore the latest full backup followed by each of the incremental backups you performed since that full backup (unless the backup program being used supports a complete restore in one restore procedure).

For example, suppose that you are relying on file-based backups, and you perform a full backup that includes **FILE1**, **FILE2**, and **FILE3**. Then, you change **FILE2**, and you perform an incremental backup. This incremental backup will include only the data of **FILE2**, since you did not change the other files in the most recent full backup. Then, if you change **FILE3** and add **FILE4** and make another incremental backup, the latest incremental backup will include only data from **FILE3** and **FILE4**.

If you are relying on sector-based backups, you perform a full backup at an interval of your choice and, in between, you perform incremental backups. But, an incremental sector-based backup is not based on files that have been added or changed. Instead, an incremental sector-based backup looks for and includes newly allocated sectors and changes to the contents of any sector since the last backup. Suppose that you move a file without changing its contents. In a sector-based backup, the sector reallocation caused by moving the file is a change that will be included in the next incremental backup, even though you didn't change the file itself.

Note: Although defragmenting the file system does not change file content, it can lead to many sector-level changes, because defragmenting files moves them from one disk location to another.

Incremental backups are hard to properly manage and tend to be troublesome during disaster recovery. It is not uncommon to discover, while trying to recover from a disaster, that an incremental backup is either lost or damaged, making all subsequent incremental backups worthless. In addition, if you accidentally restore incremental backups in the wrong order, the problems you experience may not manifest themselves until some future date, at which point recovery can become almost impossible.

Differential Backups

Differential backups include only data that has changed since the *most recent full backup* was performed. To use this method, you make a full backup at an interval of your choice. In between full backups, you perform differential backups, which include all data that has changed since the last full backup. If you need to restore your entire system, you need to restore the latest full backup followed by the latest differential backup (unless the backup program being used supports a complete restore in one restore procedure). Unlike incremental backups, which rely on every other incremental backup in the chain, a differential backup relies only on the full backup.

For example, suppose that you are relying on file-based backups and you perform a full backup that includes **FILE1**, **FILE2**, and **FILE3**. Then, you change **FILE2**, and you perform a differential backup. This differential backup will include only the data of **FILE2**, since the other files in the most recent full backup have not changed. If

you then change **FILE3** and perform another differential backup, this differential backup will include data from both **FILE2** and **FILE3**.

A differential sector-based backup includes any sector that has changed or been allocated since you created the last full backup.

Differential backups are easy to manage during disaster recovery because you need to restore only the last full backup followed by the last differential backup (some programs will restore both the full and differential backup in one restore procedure). You don't run as much risk of discovering that a backup is damaged or missing, and since you only need to restore two backups (at most), you are not as likely to restore them in the wrong order.

By its nature, the size of a differential backup grows over time. If you wait long enough between full backups, your differential backup could become almost as large as a full backup, and take almost as much time to create.

Appendix C: Introduction to Hard Drive Storage

All modern (circa 2007) personal computers make use of at least one partitioned hard drive. Knowing at least the basics of how hard drive partitioning and file systems work can help you understand how to work with TeraByte Unlimited imaging products. The information about physical hard drives that follows is intended to be a broad overview to provide you with a general understanding of the hard drive.

The Physical Hard Drive

Hard drives contain several round, thin, rigid disks called *platters*. The rigidity of these platters serves as the basis for the terms "*hard disk*" and "*hard drive*". In the center of each platter is a hole by which the platter is mounted to a spindle. The platters rotate around this spindle at high speed (typically 5,400 to 10,000 rotations per minute, or RPM).

Internal view of a hard drive in operation. The arm appears blurred due to its rapid movement.
Photo courtesy of Michael Blessenohl

The Logical Hard Drive—Hard Drive Data Organization

Data is organized on the platters of hard drives in the form of *tracks* and *sectors*, which are established during manufacturing. The tracks, which exist on each side of each platter, are concentric circles. Sectors are defined by radial lines that go from the center point of the platter to the outer edge.

When you set up a hard drive, you can create logical partitions. A logical partition is simply a conceptual division on the hard disk. You can use different file systems in different partitions, and many users partition hard disks so that they can store different operating systems or segregate data on the same hard drive. If you set up different partitions so that you can use different operating and file systems, you can

use Terabyte's BootIT Bare Metal to select the operating system in which you want to work each time you boot your computer.

Formatting is the process that prepares a partition on the hard disk to accept data by creating an empty file system that is organized into clusters. A *cluster*, a logical grouping of contiguous sectors, is the smallest logical unit of storage that you can allocate to hold a file's data.

Figures 1 through **3** depict the layout of files within clusters on a hypothetical partition. In each figure shown, 44 clusters contain data. In **Figure 1**, the *last cluster* in use (that is, the one closest to the bottom/right) is at the very end of the partition.

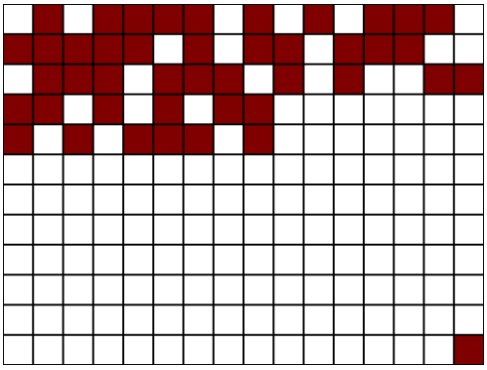


Figure 1

The location of this last cluster at the time that you create an image determines the minimum amount of free space that must be available on the hard drive to which you intend to restore—called the *target* drive.

Note: If you are restoring a partition with an image created using raw mode, or if the partition uses an unrecognized file system, the target drive needs to be equal to the full size of the source partition, regardless of cluster allocation.

Figure 2 shows the same number of clusters in use, but the *last cluster* in use is located in the fifth row, rather than at the very end of the partition:

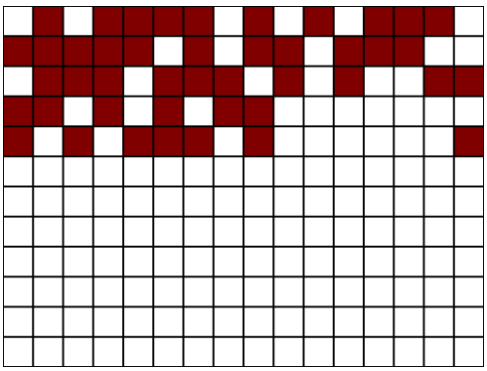


Figure 2

Although **Figure 1** and **Figure 2** depict the exact same number of used clusters, the location of the last used cluster in **Figure 2** allows you to restore an image of that partition to a much smaller target because, when an image is restored, each cluster is placed in a location on the target that is identical, relatively speaking, to its original location on the drive you imaged—called the *source* drive.

> *Note: You can use the* Compact *feature of the Terabyte Unlimited imaging programs to reduce the size required when restoring or copying.*

Figure 3 shows the same number of clusters in use, but the clusters are arranged optimally, with no unused clusters interspersed.

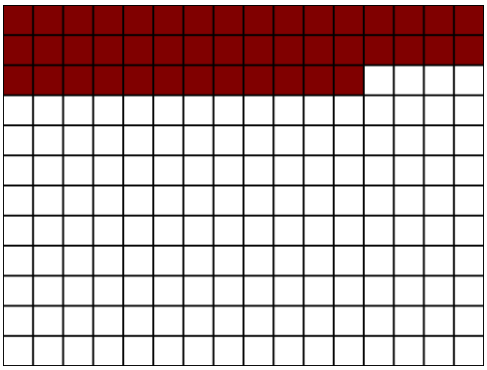


Figure 3

Although the used cluster arrangement of **Figure 3** might be most ideal, you generally can't easily arrange clusters in this way.

Appendix D: Scheduling Backups

Image for Windows contains a feature you can use to create tasks to schedule Image for Windows backups using the Windows Task Scheduler included with Windows 98, 2000, 2003, XP, Vista, Windows 7, and Windows 8. What follows is a step-by-step tutorial for using this feature.

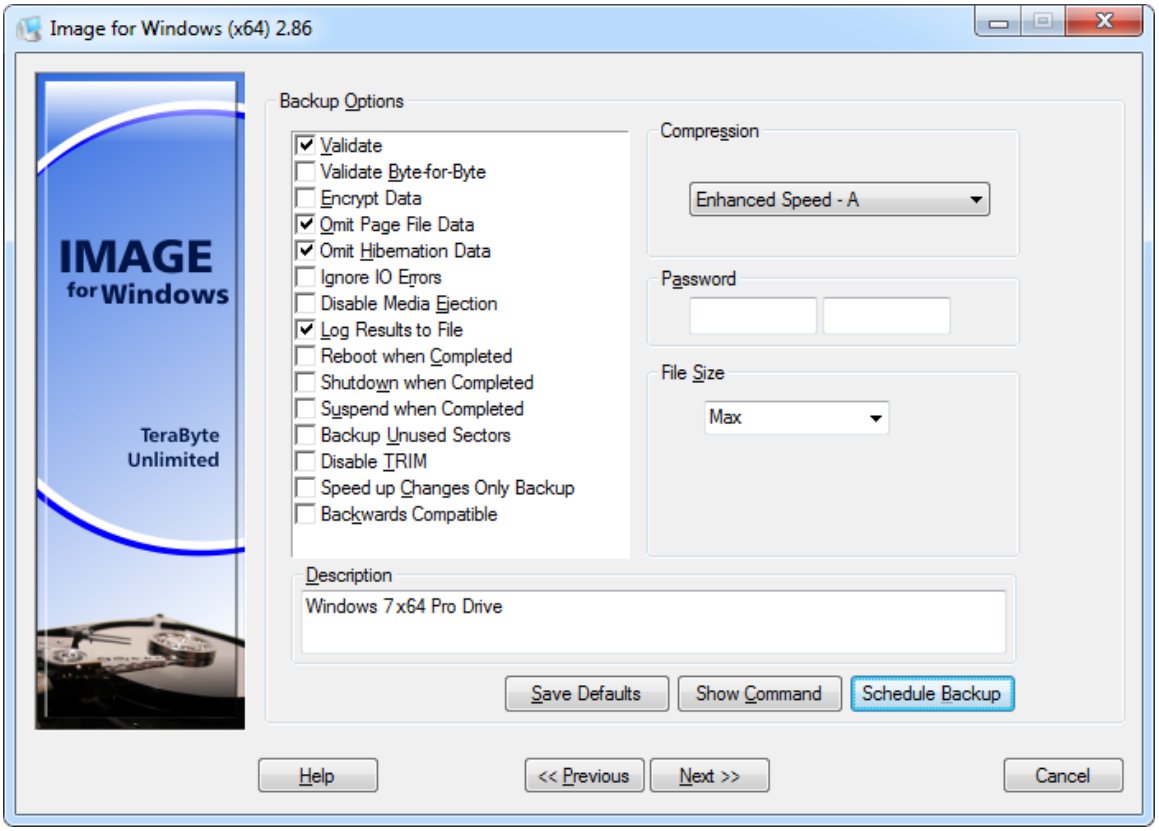
1. If creating a normal mode backup, run Image for Windows and select Backup (Full). Be sure to select the source drive, destination drive, and backup options you wish to have applied to the scheduled task.

   If creating a Simple Operations mode backup, you would just need to select the source drive and destination drive (if not auto-detected).

Refer to the section titled "Creating Backups with Image for Windows" if you need more information on how to run a backup.

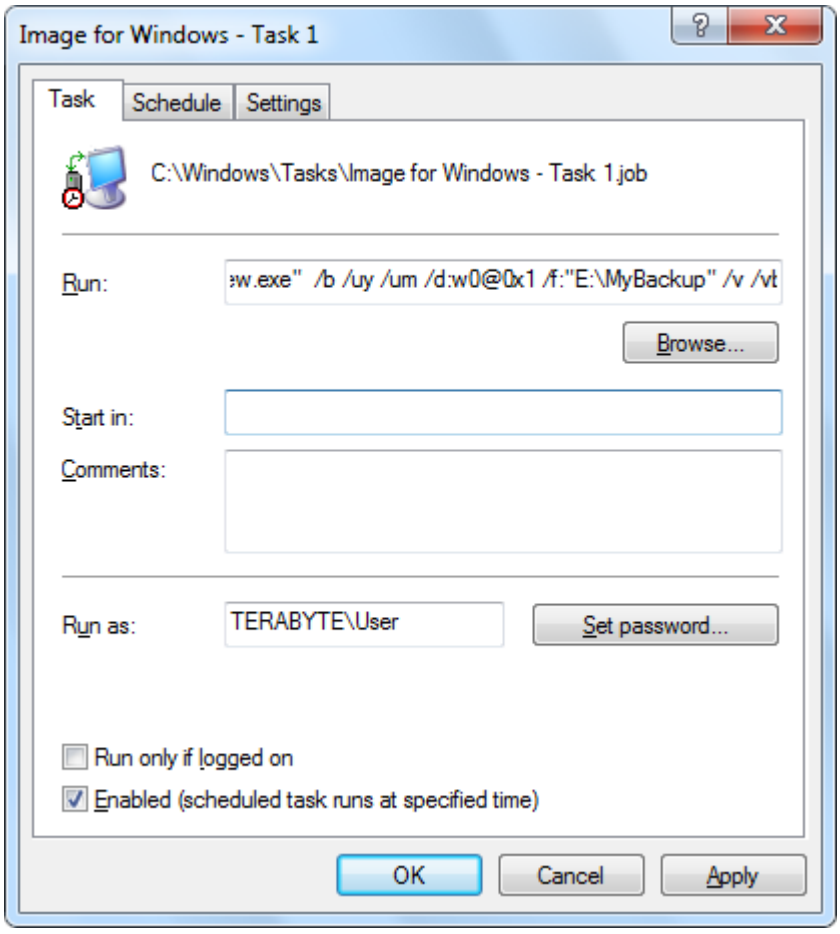
NOTE: Scheduled tasks that used network mapped drive letters may not run properly because the mapped drive letter might not exist when the program is launched or due to permission issues. To prevent this problem, use the UNC instead of a mapped drive letter.

2. On the Backup Options screen shown below (normal mode backup) or Summary screen (Simple Operations mode), click the "Schedule Backup" button.



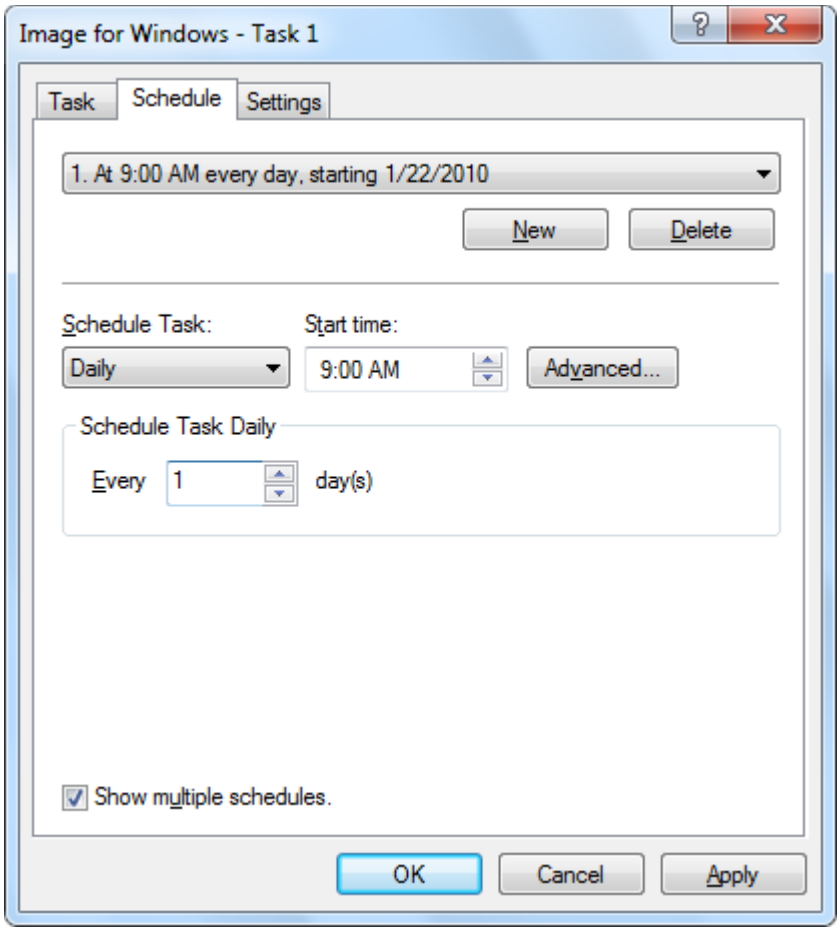
3. In the Image for Windows – Task 1 window that appears, the command line in the Run box reflects the source, destination, and backup options that you selected. The command line also includes the **/uy** and **/um** parameters that allow Image for Windows to run an unattended backup. These parameters, along with related parameters **/un** and **/ui**, are described in "Table 1: Image for Windows Global Parameters". Be sure to enter the automation options you want to have in place (i.e. **/uy /um**, **/un /um**, or **/un /ui**).

*Note: If you would like the backup to be password-protected or encrypted when the scheduled task runs, you must append **/pw:"my password"** to the command line in the task window, where "my password" is the password you wish to use. If the **/enc** parameter is present without a valid **/pw** parameter also present, the backup task will not run successfully.*



4. Click the Schedule tab, and then click the New button to create a schedule for the backup task.

Note: If you close the task window without first setting a schedule for it, the task will be deleted immediately.



5. Click the Settings tab. Configure the task settings as desired. Note: If the computer will be sleeping at the time backup should begin make sure to enable the **Wake the computer to run this task** option.

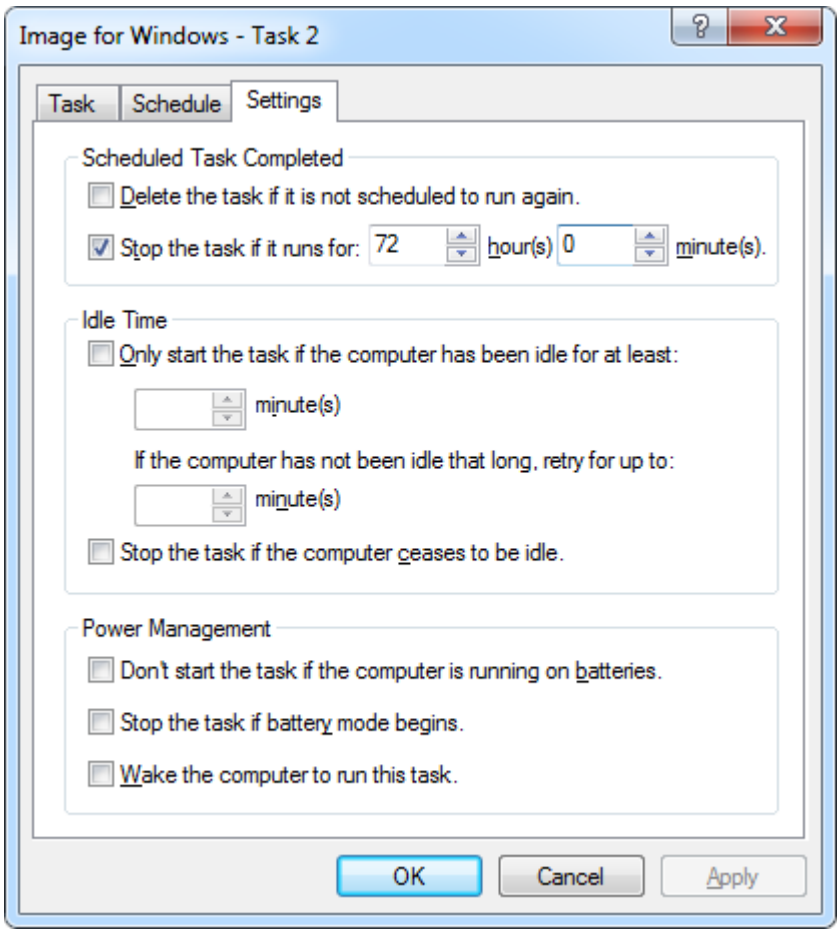
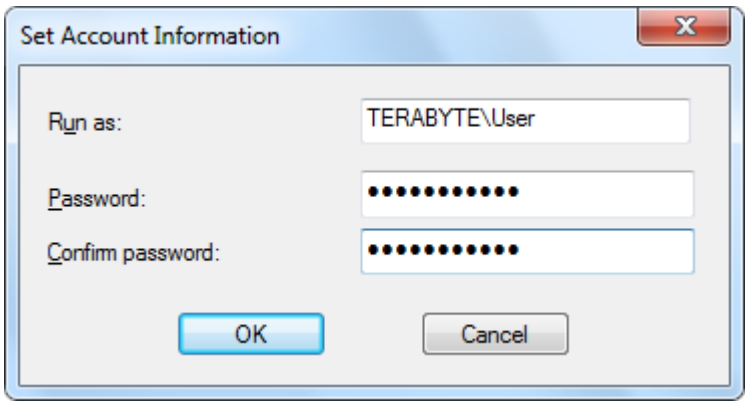


Image for Windows - Task 2
Task
Schedule
Settings
Scheduled Task Completed
Delete the task if it is not scheduled to run again.
Stop the task if it runs for: 72 hour(s) 0 minute(s).
Idle Time
Only start the task if the computer has been idle for at least:
minute(s)
If the computer has not been idle that long, retry for up to:
minute(s)
Stop the task if the computer ceases to be idle.
Power Management
Don't start the task if the computer is running on batteries.
Stop the task if battery mode begins.
Wake the computer to run this task.
OK
Cancel
Apply

6. Click OK (or Apply). You will be prompted to enter account information.

7. Supply the desired user name and password:



Note: So that Image for Windows can run successfully, the user account used must be a member of the Administrators group.

8. Click OK. A notice appears, telling you the task has been added to the Windows Task Scheduler.

Note: Scheduled tasks can be managed using the **Scheduled Tasks** tab in program Settings.

Appendix E: Restoring to a Smaller Drive or Partition

Despite ever increasing hard drive sizes, many users find themselves in situations requiring them to move to a smaller drive. The difficulty level of this process depends on a number of factors, including the method used and the details of the particular configuration. This appendix presents several methods to accomplish this task and, hopefully, provide a trouble-free transition.

Typical reasons to move to a smaller drive or partition include:

- Moving the OS partition to a faster drive (e.g. going from a 1TB hard drive to a 256GB SSD drive)
- Segregating the OS from data (e.g. splitting a single 950GB partition into a 100GB OS partition and a 850GB data partition).
- Splitting a RAID 0 setup into single drives
- Migrating to a new physical system or to or from a virtual system
- Emergency recovery using parts on hand
- Testing recovery scenarios

Procedure Summary

The basic steps are as follows:

1. **Determine the minimum space required to restore the partition(s)**

   If the source partition contains more data than can fit on the new smaller partition it will be necessary to delete files or move files to a different drive.

   When moving an entire drive to a smaller drive, you will need to check space requirements for each partition on the source drive.

2. **Check the file system for errors**

   Run `chkdsk /f` on the source partition(s) to check for file system errors. Errors can cause compacting and resizing to fail. Note: You may want to run MEMTEST86 before chkdsk if RAM integrity is unknown.

3. **Compact or resize the partition(s)**

Use the compact feature in the imaging programs to reduce the minimum required size or use BootIt BM to resize the source partition smaller. In either case, use a size less than that of the new smaller partition.

When moving an entire drive to a smaller drive, you may need to compact or resize multiple source partitions.

4. **Create a backup image of the drive or partition**

   Once the source partition or drive is ready (files moved, partitions compacted, file systems checked, etc.), create a backup image.

5. **Restore the image to the new location**

   When restoring, specify the desired new smaller size. Or, if restoring a drive image, use one of the scale options (e.g. *Scale to Fit*).

If you are planning on copying the source partition(s) to the smaller drive you can skip Step 4 and perform the copy instead of Step 5.

For more specific details on restoring to a smaller drive or partition as well as several example scenarios, please continue reading.

Preparing for the Move

Depending upon the specifics of the move and which method will be used, it's possible extensive changes will be made to the existing data – file systems resized or compacted, data deleted, programs uninstalled, file systems repaired, and so on. It is recommended to create a backup image of the drive before proceeding if data safety or the ability to return to the present state is important to you.

As an example, you may be moving from a 500GB Windows drive to a 128GB SSD. You plan to delete many gigabytes of files you won't need and uninstall several large programs. However, you would also like to preserve the data on the 500GB drive. One way to do this is to create a backup image of the drive and then make the desired changes. A new backup image can then be created and restored to the SSD (or the drive could be copied). Once the SSD is ready for use, the original drive image can be restored to the 500GB source drive, returning it to its original state.

Understanding Partition Data Organization

When you set up a hard drive, you can create logical partitions. A logical partition is simply a conceptual division on the hard drive. You can use different file systems in different partitions, and many users partition hard drives so that they can store different operating systems or segregate data on the same hard drive.

Formatting is the process that prepares a partition on the hard drive to accept data by creating an empty file system that is organized into clusters. A *cluster*, a logical grouping of contiguous sectors, is the smallest logical unit of storage that you can allocate to hold a file's data.

Table A depicts the layout of files within clusters on a hypothetical partition. 44 clusters contain data, with the last cluster in use (the cluster closest to the end of the partition) being located 75% into the partition.

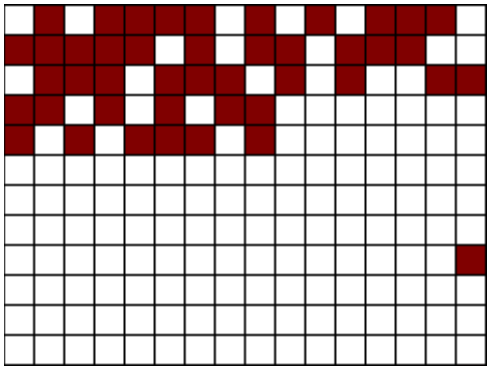


Table A

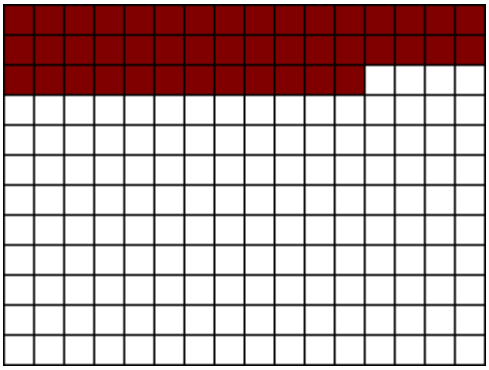


Table B

The location of the last cluster at the time that you create an image determines the minimum amount of free space that must be available on the hard drive to which you intend to restore. In this example, assuming the partition size was 100GB, you would not be able to restore it to a space smaller than 75GB.

Table B is a representation of the partition after being compacted. It contains the same number of used clusters with no unused clusters interspersed. As a result, an image of this partition can be restored to a much smaller destination.

Compacting and resizing are both operations that allow you to relocate the data in the partition while maintaining its integrity. Compacting leaves the partition size unchanged and moves the data so it fits the smaller specified size. Resizing a partition smaller is similar to compacting, but also reduces the size of the partition.

More information on this subject can be found in *Appendix C: Introduction to Hard Drive Storage*.

Determining the Space Required

When determining the minimum space required to restore a partition it's important to understand that the TeraByte imaging programs restore the partition image as an actual image. As explained in the previous section, this requires the same space for the data as the source partition since the restored data is not relocated within the destination partition while being written. Any resizing of the restored partition takes place *after* the restore has completed. This may differ from non-TeraByte imaging programs which may create the smaller destination partition first and then restore the files in the image backup to it.

The minimum space required to restore a partition can be determined from the source partition, from the image file, or by attempting to restore the partition image.

To Check the Source Partition:

1. Start the TeraByte imaging program of your choice and select to create a backup.
2. Proceed though the steps until you get to the screen where you select which partitions to include.
3. Highlight the partition and click the **Information** button in *Image for Windows*, *Image for DOS GUI*, and *Image for Linux GUI*, or press **F1** in *Image for Windows (Console)*, *Image for DOS*, and *Image for Linux*.
4. Along with other details, the number of **MiB to Restore** is displayed. This is the minimum space required to restore this partition. Please note that this value represents the data only – operating systems may require an additional minimal amount of free space in order to function correctly.

To Check an Existing Image File from the Program Interface:

Note: Version 2.74 or later is required to use this method.

1. Start the TeraByte imaging program of your choice and select to restore a backup.
2. Proceed though the steps until you get to the screen where you select which partition(s) to restore.
3. Highlight the partition to check and click the **Information** button in *Image for Windows*, *Image for DOS GUI*, and *Image for Linux GUI*, or press **F1** in *Image for Windows (Console)*, *Image for DOS*, and *Image for Linux*.
4. Along with other details, the number of **MiB to Restore** is displayed. This is the minimum space required to restore this partition. Please note that this value represents the data only – operating systems may require an additional minimal amount of free space in order to function correctly.

To Check an Existing Image File from the Command-line:

Run the TeraByte imaging program of your choice from the Command Prompt and specify the `/L`, `/ALL`, and `/F` options. Program output can be redirected to a file for easy reference. **Note:** Version 2.66 or later is required to use this method.

- Using *Image for Windows*, *Image for Windows (Console)*, or *Image for DOS*

    1. If running in Windows, start an Administrator Command Prompt.
    2. Change to the folder containing **imagew.exe**, **imagewc.exe**, or **image.exe**.
    3. Run the command (*Image for Windows* is used below):
       ```
       imagew /l /all /f:"e:\backups\my backup" > output.txt
       ```
       This will obtain all the partition information from the **e:\backups\my backup.tbi** image and save it to a file named **output.txt** in the same folder as **imagew.exe**.

If using *Image for Windows (Console)* or *Image for DOS* you can view the output onscreen by not redirecting it. For example:
```
imagewc /l /all /f:"e:\backups\my backup"
```

- Using *Image for Linux* from the IFL Boot Media

    1. Boot to the IFL CD. If necessary, mount the partition or network share that contains the backup image file. Use the **Mount Network Shares** menu option or exit to the Command Prompt and use **dpmount**.
    2. Select the **Exit To Command Prompt** menu option. By default the current path is the one which contains **imagel** (`/tbu`).
    3. Run the command:
    ```
    imagel -l --all --f "mnt1/backups/my backup" > output.txt
    ```

    This will obtain all the partition information from the **mnt1/backups/my backup.tbi** image and save it to a file named **output.txt** in the same folder as **imagel**. Note: The output.txt file may contain escape code sequences as well as the partition data and may look strange in a text editor.

    Output can also be viewed onscreen by not redirecting it:
    ```
    imagel -l --all --f "mnt1/backups/my backup"
    ```

    Use *Shift-PgUp* and *Shift-PgDn* to scroll through the output. If the console buffer is too small to let you view all the information you will most likely need to redirect it to a file.

Examine the output and find the details of the partition you're going to restore. The **Last Used Sector** value determines the minimum space required to restore the partition.

For additional information on using this method, please see the corresponding TeraByte KB article.

To Check by Attempting to Restore the Partition Image:

Note: This method is included for completeness only.

1. Start the TeraByte imaging program of your choice and select to do a normal restore of the partition.
2. Select the destination partition or free space area and click **Next**.
3. A notice with the number of MiBs required will be displayed if the destination is too small. If you must know the minimum size and the notice is not displayed, you can select a very small partition (or one you know is too small) as the target.

    Important Note: When restoring or copying a partition, any unallocated space located adjacent to the destination partition will be included in the available size. For example, if the drive contains a 10GB partition and has 25GB of free space adjacent to it, you could successfully restore a partition image that requires 30GB to the 10GB partition. The restored partition will begin at whichever location is

located towards the beginning of the drive. For example, if the free space is located before the partition, the restored partition begins where the unallocated space begins.

Disk images are treated differently than partition images. When restoring a disk image you will not be notified if the image won't fit after selecting the destination drive. Instead, you must proceed to the options screen and click **Next**. The reason for this is that alignment options or one of the scaling options (*Scale to Fit* or *Scale to Target*) may be used, which could change the requirements. The actual space necessary cannot be determined until the state of all options are known.

Note: Mounting an image will not allow you to obtain the minimum size required for a restore.

Removing Unwanted Programs and Files

Once you have determined the space that will required to restore or copy to the new smaller drive or partition, you'll know how much data will need to be removed to allow it to fit. In many cases, this will require deleting large data files (archives, ISO downloads, installers, videos, music, etc.) . You may also need to uninstall certain programs, planning to reinstall them to a different partition when needed.

It should be noted that deleting files from a partition may not lower the minimum required size to restore the partition since data may still exist at previous furthest "in use" location on the partition. Check the space required after deleting files to determine the current size.

If moving to an extremely small drive (like a small SSD), you will likely need to remove almost everything that isn't part of the standard Windows installation. In these cases, you may want to consider the option of installing Windows to the new drive and starting over fresh.

Make Sure the File System is Clean

Whether restoring to a smaller drive or to a smaller partition, file system errors on any of the source partitions can cause numerous errors, including failure to resize or compact the partition. If you are unsure of the condition of the file system, you may want to run `chkdsk /f` on it before imaging or copying it. In general, it's a good idea to run MEMTEST86 before running chkdsk (bad memory may cause chkdsk to corrupt the partition).

To do this, open a Command Prompt (an Administrator Command Prompt is required in versions of Windows with UAC is enabled) and run the following command, making sure to use the correct drive letter for the partition to be checked:

```
chkdsk c: /f
```

Note that checking some partitions, such as the Windows partition, may require Windows to restart. In the case of multiple partitions needing to be checked it may be advantageous to check them from WinPE (e.g. TBWinPE) – since Windows isn't running and no partitions are locked, restarts will not be required.

Compact or Resize the Partition(s)

Compacting or resizing a partition requires that it be available to be modified. If the only source of the desired partition is an image backup, you must first restore the image to a drive large enough to contain it so it can be compacted (or resized) and then reimaged or copied.

Also note that you can't compact a partition that's in use (for example, you can't compact the booted Windows partition). You would need to boot to Image for DOS, Image for Linux, or Image for Windows in WinPE.

To compact a partition:

1. Start the TeraByte imaging program of your choice.
2. Select to create a backup.
3. On the partition selection screen highlight the partition that needs compacted.
4. Click the **Compact** button (graphical versions) or press **F3** (console versions).
5. Enter the new size.

To resize a partition:

1. Boot into BootIt Bare Metal.
2. Enter *Partition Work*.
3. Select the partition than needs resized.
4. Click the **Resize** button.
5. Enter the new size.

The time required to compact or resize a partition depends on the amount of data that must be moved and the speed of the system.

Examples

Several examples of restoring to a smaller drive or partition are shown below:

- Example 1 – Normal Restore
- Example 2 – Compact/Resize, Image, and Restore

For more details and an additional method (using "robocopy"), please see the corresponding TeraByte KB article.

Unless otherwise stated, the examples below are using the following base system configuration:

- The source drive is 500GB with a single 465GB partition containing Windows and 150GB of programs and data.
- The source drive's required space for restore is 220GB.
- A backup image of the source drive has been created (SOURCE.TBI).
- The destination drive is either a 128GB or 256GB SSD drive.

Example 1 – Normal Restore

For the purpose of this text, a “normal restore” is one which requires no compacting, resizing, or special steps to accomplish prior to restoring. This type of restore can be used any time the required space for the restore is less than the available space on the destination drive – even if the source partition is actually much larger.

Using the example configuration, SOURCE.TBI can be restored normally to the 256GB SSD since it requires only 220GB. It would not be possible to do a normal restore to the 128GB SSD due to insufficient available space.

When restoring an OS partition or disk image (entire drive), any standard options necessary to ensure proper booting would also apply here (*Set Active*, *Update BOOT.INI*, *Update Boot Partition*, *Restore First Track*, etc.). Additionally, when restoring a disk image and the source drive was larger than the destination, the *Scale to Target* or *Scale to Fit* option must be selected. Otherwise, the program will report that there’s not enough space on the destination drive even if there is.

Example 2 – Compact/Resize, Image, and Restore

Using the example configuration, restoring an image of the 465GB partition to the 128GB SSD could be performed as follows:

Using Compact:

1. Move 100GB of data files to a USB drive to bring the total used space down to around 70GB.
2. Boot to Image for Linux and select to create a backup.
3. Select the 465GB Windows partition.
4. Make sure the 465GB Windows partition is highlighted and use the **Compact** option (press **F3**).
5. Specify a size of 100GB.
6. After the compaction completes, continue with creating the image of the partition.
7. Restore this image to the 128GB SSD, specifying to resize it to use all available free space. When restoring an OS partition, any standard options necessary to ensure proper booting would also apply here (*Set Active*, *Update BOOT.INI*, *Update Boot Partition*, etc.) – just as with a normal restore.

Using Resize:

1. Move 100GB of data files to a USB drive to bring the total used space down to around 70GB.
2. Use a partitioning program (such as BootIt BM) and resize the 465GB partition to 100GB.
3. Boot to Image for Linux and select to create a backup.

4. Select the 100GB Windows partition and create an image of it.
5. Restore this image to the 128GB SSD, specifying to resize it to use all available free space. When restoring an OS partition, any standard options necessary to ensure proper booting would also apply here (*Set Active*, *Update BOOT.INI*, *Update Boot Partition*, etc.) – just as with a normal restore.

Either method will accomplish the same results. You may end up compacting some partitions and resizing others depending on the particular need at the time.

Once a partition has been compacted or resized an alternative method would be to copy it directly instead of imaging and restoring.

Glossary

Hard Drive (HD, HDD)

A high-capacity, non-volatile, data storage device. Hard drives are typically installed inside a computer. In addition, they are used in many external devices, connected via USB, eSATA, etc.

Partition

A unique area of a hard drive that is allocated for use by a file system. A hard drive can contain many partitions.

File System

An organized structure that allows data to be stored and accessed by a filename. You can basically think of it as the filing system used by the operating system to store and retrieve your data. On a hard drive, the file system almost always resides in a partition.

Volume

Generally, a volume is considered to be any file system or device that is used to hold data, but, when using Image for Windows, it also represents a specific partition that resides in an extended partition.

Extended Partition

A special type of partition that is divided in to one or more partitions called volumes.

Drive Letter

A single letter that represents a file system in Microsoft operating systems. Since a file system on a hard drive is almost always in a partition or volume, it also represents a partition or volume.

Logical Drive

A term used in Microsoft operating systems to describe the specific drive letters that point to volumes. In practical terms, it is the same thing as a drive letter.

Source

When backing up, “source” refers to the hard drive that you want to back up. When restoring, “source” refers to the location on a storage medium that contains a backup you want to restore.

Target

When backing up, “target” refers to the location on a storage medium (usually CD/DVD discs, a hard drive partition, or an external hard drive) where you want to store a backup. When restoring, “target” refers to the location on a hard drive where you want to restore a backup you previously created. A restore target can either be an area of free space or a partition. In the latter case, the partition—and any information it contains—will be deleted immediately prior to the restore.

What is Shareware?

Shareware distribution provides users with the opportunity to try software before buying it. If you try a Shareware program and continue using it, you are expected to register it. Individual programs differ on details; some request registration, others require it, and some specify a maximum trial period. When you register the software, you may receive anything from the right to continue using the software to an updated program with printed manual.

Shareware is a distribution method, not a type of software. Because you can try shareware before you buy, you can easily determine if a particular piece of software will fill your needs. Also, because the overhead is low, prices are low. Shareware has the ultimate money-back guarantee—if you don't use the product, you don't pay for it.

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(Revised April 1, 2011)

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